

The Iron Age

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A Review of the Hardware, Iron and Metal Trades.

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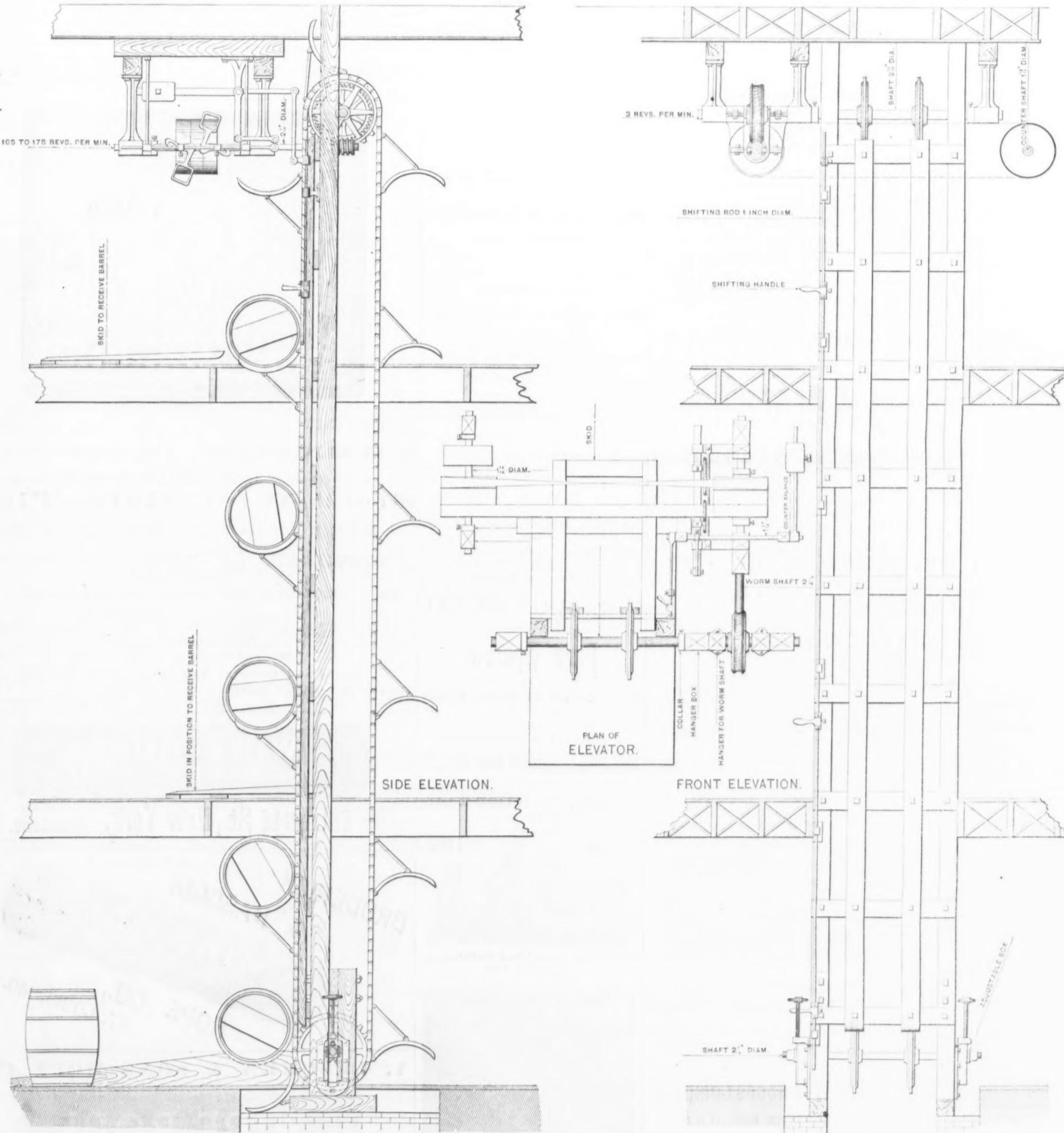
Barrel and Package Elevator.
We present on this page several views of a barrel and package elevator, built by the Roller Chain Belting Company, of Columbus, Ohio. The design of the whole contrivance is very simple, and requires but little explanation. The barrel or package can be picked up

ering the attachments will strike them, producing an automatic stop until the attendant is ready to receive the load; then, by simply raising or lowering the handles, the elevator is put in motion again. Reverse motion is obtained by a straight and cross belt working on three pulleys, and is shifted either to the right or left as desired. This

able to all other chains for an elevator of this kind, it being the only chain made with a loose roller, and, as the load is constantly pushing backward on the chain, the rollers take a bearing on the plank running from top to bottom of the elevator, thus always keeping the rollers in motion and taking away the entire friction on the plank which

888,030 respectively and in 1885, \$39,752 734 and \$4,715,201. While the exports are about up to the average of the last few years there is a considerable falling off in the imports. Ontario, Quebec, Manitoba and the Territories last year exported goods to the States to the value of \$31,206,178, and imported to the extent of \$30,828,838. The

6200 feet apart, met at an intermediate point with no perceptible variations in the line. Chief Engineer B. S. Church said: "The skill displayed by the division engineer and his assistant in projecting and establishing the line and grade in the tunnel itself, with such surprising accuracy, is remarkable. The points whereby this accurate line is



BARREL AND PACKAGE ELEVATOR, BUILT BY THE ROLLER CHAIN BELTING COMPANY, COLUMBUS, OHIO.

at any floor and delivered either above or below, as desired, the operator having complete control of the elevator at any floor. From both side and front elevations it will be noticed that special handles are provided on shifting rods operating the belt nipper at the top. If at any time the operator is engaged in storing the barrels or packages, these shifting handles can be placed at such angles that in raising or low-

arrangement is claimed to be much more durable than that embracing the use of a clutch. Motion is transmitted to the elevator by means of a worm and worm wheel.

At each floor a skid is placed so that when the barrel has passed through the floor the skid is moved forward over the opening to receive the barrel; then, after discharging the load the elevator is put in motion again. The roller chain used is claimed to be prefer-

occurs with all other chains. The elevators can be constructed for any height or capacity.

The trade returns between Canada and the United States for the fiscal year ending June 30 have been made up. The exports amounted to \$39,523,685, the imports to \$34,958,110, or a total of \$72,881,387. The figures in 1886 were \$36,578,769, and \$44,

value of the maritime province exports to the States was \$4,980,931, and the imports \$2,453,370. British Columbia exports to the States for the year are valued at \$1,660,168, and the imports to \$1,705,512.

Very accurate engineering work was shown at the tunnel excavations of the new croton aqueduct last week, when the headings of the two deepest shafts,

established in the tunnel are so close together that an error of the thickness of the wire sustaining the plumb box suspended from the surface would make a deviation of many inches at a distance of 3500 feet. Therefore, repeated trials were required to establish each of these points in the tunnel in order that the projected line might strike the center of the bull's eye, so to speak, over 3000 feet away in the tunnel."

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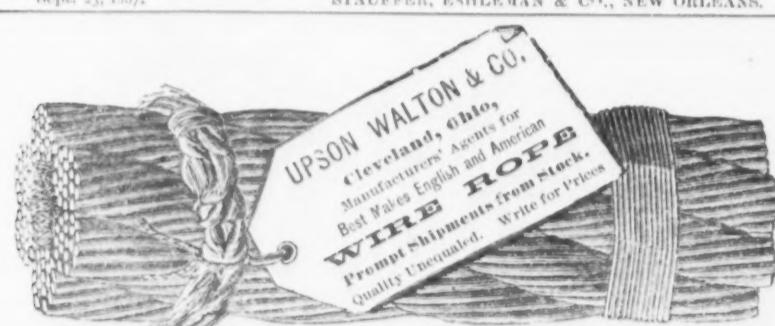
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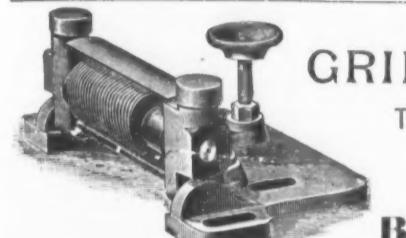
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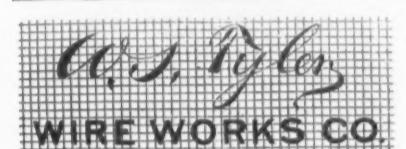


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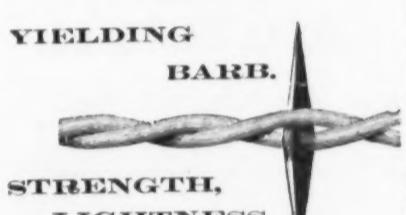
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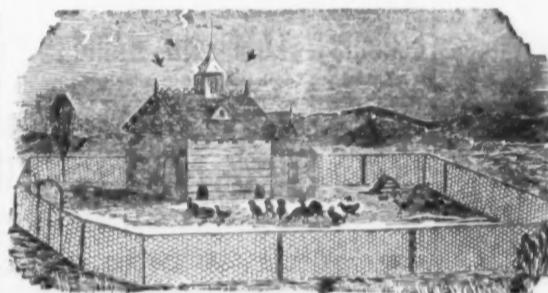
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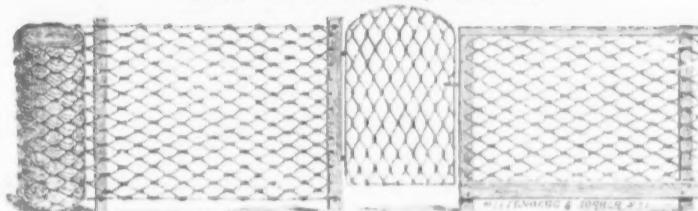
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Fig. 220.

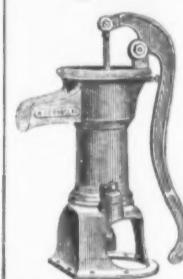


Fig. 209.



Fig. 70.



DOUGLAS' DIAPHRAGM PUMPS.

"LOUD PATENT."

A LARGE CAPACITY, AND EASY WORKING PUMP FOR

Water Works, Sewer Contractors, Foundation Builders, Mines, Quarries,
Fig. 381.or wherever it is desired to raise a large quantity of water by
hand power.The pump has large valves (accessible by hand) and will pump
water containing sand, gravel, sewage matter, &c., without choking
or any perceptible wear.

Capacity from 3,000 to 4,500 gallons per hour.

These pumps are simple, durable and low priced.
Made either as shown in cut for Hose or for IRON Pipe Suction
underneath.

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WARRANTED.

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These Wrenches are manufactured of Norway Iron and Steel Forgings, and case hardened.

All parts of these Wrenches are warranted. Should any part break it will be made good free of charge on application to the merchant from whom you purchased.

Under the greatest strain the sliding jaw will not yield a hair, but remains as firmly fixed as if welded to the bar.

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are drawn from the best Swedish Iron Rods only. They are hot-forged and cold-pointed rendering them tough, stiff and easy driving, and are warranted

FIRST-CLASS IN EVERY RESPECT.

All Nails branded "ESSEX" are Fully Guaranteed.

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MANUFACTURERS OF RIVERSIDE

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Small T Rails, Flat Rails of Iron or Steel, Fish Bars of Iron or Steel.

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Established in 1839.

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only successful re-enforced bar.The Ferrule is firmly secured in place
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fastened to the shank.This Handle is made better and
stronger than heretofore by using our
new Cup Tip at the end which encloses
the wood and keeps it from splitting.
This is the only wrench which has the
wood handle firmly secured and held
together at each end, and it will stand
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any now made. It is not affected
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None Genuine unless Stamped,

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and 95 Reade Sts.,

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JOHN H. GRAHAM & CO., Agts.





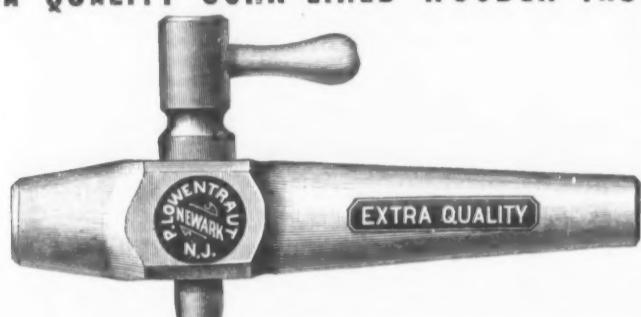
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Superiority acknowledged wherever used, sold or exhibited.

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MANUFACTURER OF
EXTRA QUALITY CORK-LINED WOODEN FAUCETS.



All goods stamped "P. Lowentraut" are warranted to be extra quality.

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One barrel containing...	35	0	6	\$.75
" "	26	2	7	.75
" "	22	4	8	1.00
" "	16	6	9	1.25
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" "	12	5½	12	2.00
" "	6	9	18	3.25
" "	5	9½	24	4.00
" "	5	10	14	4.25
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LIGHTNING HAY KNIVES
WEYMOUTH'S PATENT.

This Knife is the **REST IN USE** for cutting down hay and straw in mow and stack, cutting fine feed from bales, cutting corn stalks for feed, cutting peat & ditching marshes. The blade is **BEST CAST STEEL**, spring temper, easily sharpened, and is giving **universal satisfaction**. A few moments' trial will show its merits, and parties once using it are unwilling to do without it. Its sales are fast increasing for export as well as home trade, and it seems destined to take the place of all other Hay Knives. They are nicely packed in boxes, 1 dozen each of 60 pounds weight, suitable for shipping by land or water to any part of the world.

Manufactured only by
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For sale by the Hardware trade generally.

CAUTION.

We are informed that various parties are infringing upon the widely-known Letters Patent granted originally to GEORGE F. WEYMOUTH for an improved Hay Knife. The invention patented to GEORGE F. WEYMOUTH is embodied in a sword-shaped blade provided with operating handles for working the same, the edge of the sword-blade being furnished with knife-edged serrations or teeth. **IT IS OUR PURPOSE TO PROSECUTE ALL INFRINGEMENTS**, and to hold responsible to the extent of one-half any damages suffered by all parties who manufacture and sell the same. The inventors, who deal in the same, Seven units are now pending in the U. S. Courts. **ALL MANUFACTURERS AND DEALERS ARE HEREBY WARNED** of our rights, and the public are cautioned against purchasing any Hay Knives, besides as described above, which are not of our genuine manufacture.

EAST WILTON, Sept. 1, 1886.

North Wayne Tool Co.,
HALLOWELL, MAINE.

W.H. CARTER'S PATENT NEEDLE HAY KNIFE.
PAT. APR. 29, 1884.
IMPROVED BY M.M. BARTLETT.
Improvement Patented April 28, 1885.

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Patented April 29, 1884.

Improvement patented April 28, 1885, of which we are the sole manufacturers, has been tested with the most celebrated knives of other makers, and has proved the easier and faster cutter than any other. Its special excellence consists in the ability to touch down in the mow, stack or bale, and to cut any work for which a hay knife is used. It can be readily ground by the most inexperienced, as it requires to be ground only on one side. Should a tooth break, all that is necessary to replace the damage is to grind it once and a new chisel-tooth appears. It can ordinarily be sharpened with a common scythe stone. Try one and you will give it the preference.

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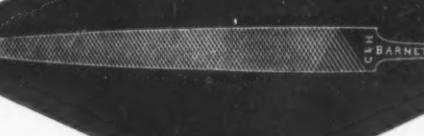
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Specially Adapted for Use on Wire Fence.

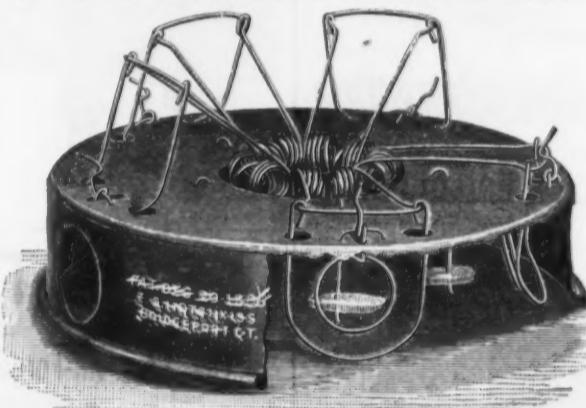
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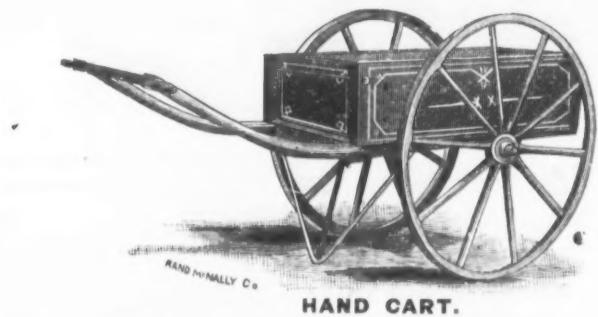
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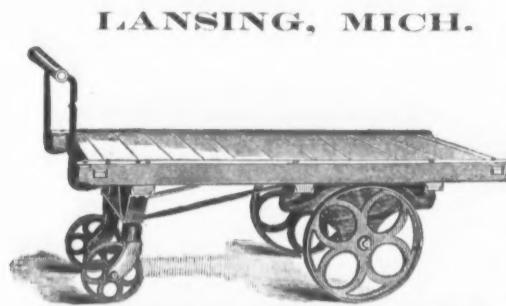
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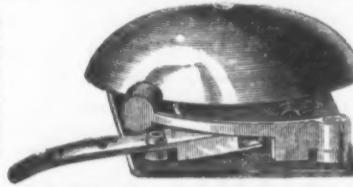
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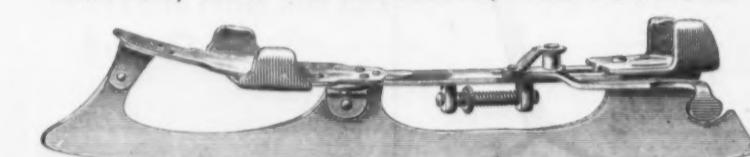
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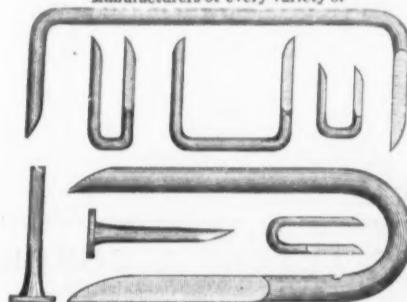
1837

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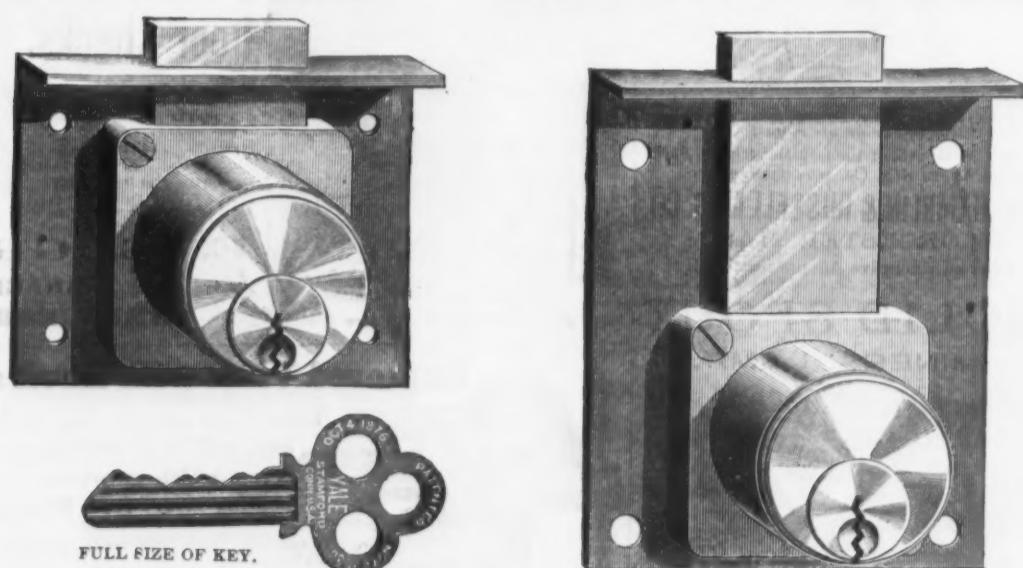
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The Engineering Feature of the Nicaragua Ship Canal.*

The Nicaragua Canal is known by name, probably, to a majority of persons in this country; but the revised route, the enlarged capacity and the new features presented as the result of the last survey, made two years ago by the United States Government expedition in charge of Civil Engineer Menocal, United States Navy, are not so well known, and of them I will speak. The distance from ocean to ocean by the proposed route is 169.8 miles. Of this distance, however, only 40.3 miles are actual canal, the other 129.5 miles being free navigation through Lake Nicaragua, the Rio San Juan and the valley of the San Francisco. Beginning at the port of Brito on the Pacific side, the canal ascends the valley of the Rio Grande by four locks, and cutting through the low divide enters Lake Nicaragua 17.27 miles from Brito, at an elevation of 110 feet above the sea. The route then extends across the lake, which is 40 miles wide and over 90 miles long, to its outlet into the Rio San Juan, a distance of 56½ miles. Then down the broad, deep reaches of the majestic San Juan to the dam, 64 miles from the lake. This dam, 1255 feet long and 52 feet high, backs the water of the river the entire distance to the lake, and makes it simply an extension of the lake. On the north bank of the river just above the dam, a short section of canal, less than 2 miles long, cuts through the hills into the Y-shaped valley of the Rio San Francisco, lying north of the San Juan and separated from it by a range of hills. An embankment 6500 feet long and 51 feet high in the center, built across the stem of the Y, floods this valley to the level of the water above the dam, and makes about 10 miles of lake navigation. At the eastern end of this lake commences the eastern division of this canal, and pierces the divide by a cut 14,200 feet long, and averaging 149 feet in depth. At the eastern end of this cut is the upper lock of the Atlantic flight, and from here the canal descends the valley of the Deseado by three locks to the sea level, and stretches across the lagoon region back of Greytown to the harbor, 11½ miles distant. From the last lock to Greytown, the same as at Brito on the west side, the canal is enlarged, forming an extension of the harbor 11½ miles inland. The lake and the river must form a part of any and every canal route through Nicaragua, and the location as a whole is the result of Civil Engineer Menocal's complete and exhaustive personal knowledge of the entire country from ocean to ocean, gained in the course of eight different surveys, extending over a period of 15 years, and supplemented by a conscientious study of all that has been done by others in that region.

Of the 40.3 miles of actual canal, about 27 miles will be excavation pure and simple, while the remaining 13 miles will be largely, if not entirely, excavated by dredges. With the convenient dumping ground for earth excavated, with a large portion of the rock from the summit cut utilized close at hand in the construction of the locks, the dam across the Rio Grande, and in pitching the slopes of the canal, and a still larger quantity to be consumed in the construction of the breakwaters at Brito, the work in this section admits of the most economical execution. The divide-cut from the basin of the San Francisco to the upper lock, 14,200 feet in length, and with an average depth of 149 feet, is, it is admitted, a very serious job; but with the neighboring streams offering water at a high head for removing the surface earth by hydraulic mining, with a large plant of power-drills worked by compressed air, from the same source, and the use of modern explosives to remove the rock, with a large proportion of the excavated rock to be used in the construction of the locks and the dam, and in pitching the slopes of the canal, and a still larger quantity utilized in the construction of the harbors at Greytown; with the laborers above the minas and mosquitoes of the swamp and exposed to the pure breath of the trade winds, the work can be done without serious difficulty.

There are two features of this project which, to many who have not made such structures a study, cause a question of safety to arise; one is the dam, which at one stroke gives us 64 miles of a river navigation, and the other is the embankment, which at a second stroke gives us over 8 miles of lake navigation, and completely solves for that portion of the canal from the dam to the divide (13 miles) the important problem of protection from surface drainage; but neither of them are anything more than small affairs when compared with many others scattered about the world, and serving much less important purposes than the ones under consideration, and beside the Quaker Bridge Dam they are pygmies. Right here at the Croton reservoir is a dam which is to-day standing twice the strain that either of them will ever be called upon to resist. The locks are to be magnificent structures of concrete, 850 feet long, 30 feet wide and 30 feet deep, capable of containing any merchant vessel afloat, except the Great Eastern, and possibly the City of Rome. The necessary machinery for moving the locks and culvert gates, for hauling the ships in and out of the locks, for electric lights and other purposes, will be worked by hydraulic power furnished by the locks themselves.

In regard to the general question of locks, the late Ashbel Welch and the late John G. Stevens are quoted at some length in favor of their use. Much has been said about the harbors at the termini of the Nicaragua route, and neither time nor space will permit me to enter into the discussion here. It may be said, however, that there is no practical route for a canal across the American Isthmus that has good harbors, and it is believed that those at the termini of the Nicaragua Canal can be made first class at less cost than those of any other route. There is nothing more difficult in the improvement of Brito Harbor than has been successfully accomplished at numerous French and English breakwater protected ports and harbors, and the maintenance of the harbor of

*Abstract of paper read before the American Association for the Advancement of Science at the New York meeting, by Civil Engineer R. E. Peary, United States Navy.

Greytown will be a much less serious job than is the maintenance of the Port Said entrance of Suez, with the enormous salt discharge of the Nile driven across its mouth by strong littoral currents.

Lake Nicaragua has a surface area of some 2000 square miles, and a drainage area of not less than 8000 square miles, and the Rio San Juan, its only outlet, discharges at its lowest stage, near the close of the dry season, eight times the maximum supply required by the locks. An inexhaustible supply of the best building material, such as lime, natural cement, stone and timber, can be obtained on the line of the canal, and with an abundance of palm leaves for thatching such temporary buildings as are required for the accommodation of the working force and the protection of property can be constructed at little more expense than that of the building of the material.

At Suez the traffic has been seriously delayed by the dimensions of the canal and the inadequate number of the turnouts. In the present project not only have enlarged prisms been provided for, but larger basins are proposed at the extremities of the locks. These basins, the enlargement of the canal at each end, with the lake, the river and the San Francisco basin, will permit vessels to pass each other without delay at almost every point on the route. In 22.37 miles, or 57 per cent. of the canal in excavation, the prism is large enough for vessels in transit to pass each other, and of a sectional area in excess of the maximum area in the Suez Canal; the remaining distance in which large vessels cannot conveniently pass each other is so divided that the longest is only 3.67 miles in length; that, with two exceptions, those short reaches of narrow canal are situated between the locks, and can be traversed by any vessel in less time than is estimated for the passage of a lock; consequently, unless a double system of locks be constructed, nothing will be gained by an enlargement of the prisms. In the lake and in the largest portion of the San Juan River vessels can travel almost as fast as at sea. In some sections of the river, and possibly in the basin of the San Francisco, although the channel is at all points deep and of considerable width, the speed may be somewhat checked by reason of the curves.

Estimated Time of Through Transit by Steamer.

	H. M.
38.98 miles of canal, at 5 miles an hour.....	7 48
8.51 miles in the San Francisco basin 7 miles an hour.....	1 14
64.54 miles in the San Juan River, at 8 miles an hour.....	8 4
56.50 miles in the lake, at 10 miles an hour.....	5 39
Time allowed for passing seven locks, at 45 minutes each.....	5 15
Allow for detention in narrow cuts, &c.....	2 00
Total time.....	30 00

The experience of the Suez Canal shows that the actual time of transit is more likely to fall under than to exceed the above estimate. The traffic of the canal is limited by the time required to pass a lock, and, on the basis of 45 minutes (above estimated) and allowing but one vessel to each lockage, the number of vessels that can pass through the canal in one day will be 32, or, in one year, 11,680, which, at the average net tonnage of vessels passing the Suez Canal, will give an annual traffic of 20,440,000 tons. This is on the basis that the navigation will not be stopped during the night. The estimate of the total cost of the canal is \$64,043,699, which sum includes 25 per cent. for surveys, hospitals, &c., and contingencies. The completion of the canal will require six years, one for final location and five for active work of construction, and the probable traffic for 1892, the possible date of completion of the Nicaragua Canal, is 6,506,214 tons.

Senator Frye, of Maine, who has just returned from an extended tour through Europe, reports as follows: "I went over many of the iron and steel factories in Belgium and could not find a single man who got more than 80 cents. The average there was about 60. At the Langlois Iron Works, on the Clyde, where they make 300 tons of pig iron a day, the laborers get from 54 to 62 cents per day; skilled men earn 75 cents to \$1.12, and more of them the lower figure rather than the higher one. What sort of a life would the Pennsylvania pig-iron makers live if they had such wages? Why, coal and iron miners have to work hard to make over \$5 a week, and out of that they have to board themselves."

A Michigan syndicate, managed by Miles P. Cook, of Flint, Mich., have purchased 100 acres of land near Mobile, Ala., being the largest deal of the kind made in any Southern city since the war, and are going to open new streets, grade, pave and lay walks. It will be a Michigan village in Mobile, as many of the lots were spoken for by Michigan people before the deal was closed. Mr. Cook is the Michigan Passenger Agent of the Mobile and Ohio Railroad. The Mayor of Mobile has also appointed a committee of leading men who are to be seconded by the Chamber of Commerce, to perfect plans and arrangements by which the great natural advantages of Mobile as a manufacturing point shall be brought to the attention of the East, North and West. There is an awakening which will be productive of much good. Eligible sites and buildings for shoe factories, tanneries, hardware factories, iron works, &c., will be secured, and correspondence opened with Northern manufacturers in search of new locations.

Some time since the Roadmasters' Association discussed a report by a special committee on standard rails. In the course of that interchange of opinions H. W. Reed, of the Savannah, Florida and Western Railway, gave his experience as follows on the subject of heavier rails: "Last year one of my divisions was laid with 50-pound steel rail; the following year it was laid with 60-pound steel rail, made under the same specifications. A carefully kept account showed an increased economy of maintenance in favor of the 60 pound rail sufficient to cover the interest and deterioration on the additional 10 pounds, and to say that we have a better track is not even expressing the full benefit derived."

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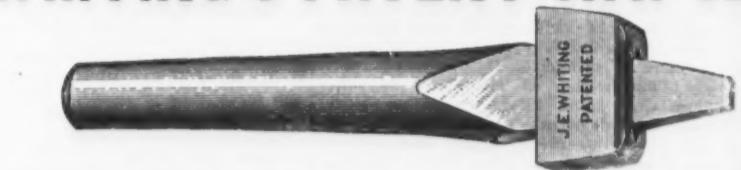
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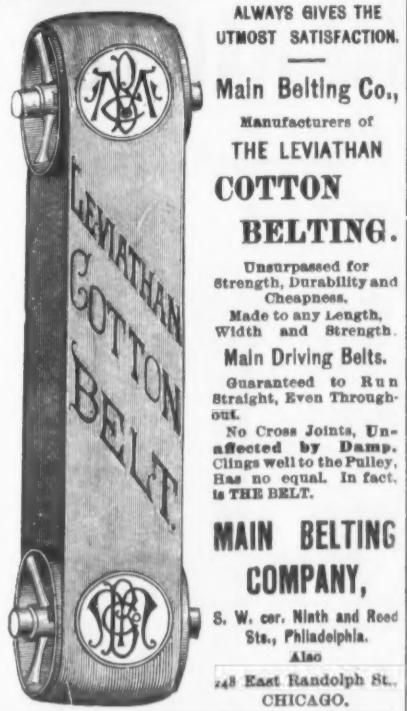
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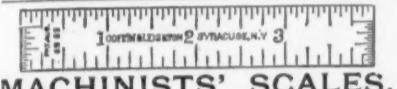
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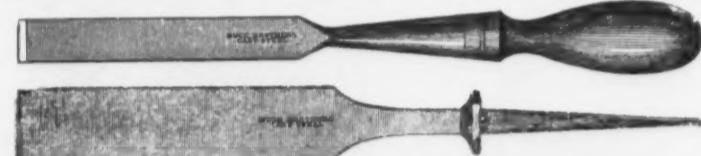
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Transmission of Power by Belting.

At the recent National Electric Light Convention at Philadelphia, Mr. J. H. Shay read the following paper:

The transmission of power from its origin at the driving wheel to the receiving pulley or shaft originated, as nearly all mechanical appliances have had their birth, in necessity, and in their first existence such creations have always been crude and imperfect. Thus we see in ancient pictures that strips of rawhide were used, more or less twisted, perhaps, with huge and ungainly knots where the ends of the pieces are connected. From this an advance was made when cordage of imperfect construction became common, a lineal descendant of the twisted thong or a flat, untanned strip, or series of strips, of rawhide were connected by every conceivable form of knot or other awkward connection. The time which elapsed before any reasonably fair belting made its appearance may be counted by scores of years, and during that long period of all the various devices the most satisfactory had proved to be a tanned leather belt. Still the users of belts were not happy over the results obtained, and a radical innovation was made when an iron wire cable or rope made a stir for a comparatively short time. Yet except for special purposes it has found little favor. A few of the more serious objections to a wire rope are perhaps worth bare mention. Constant use as a belt will in a comparatively short time crystallize and render the wire brittle, when it will of course refuse to bear the strain, and gradually give way.

The repairing of a broken wire cable belt is extremely difficult, and the mended portion is never of the same diameter as before.

When it commences to fail, it is but a short time until its ruin is complete—and, lastly, no round belt has bearing enough to do perfect work where solid hard labor is required of it, and the wire belting is no better than any other round belt on that account. Other methods of transmitting power by gearing, &c., had their day, but these have gone out of use, and there is nothing to be gained by discussing these noisy methods. For the past half century these have been gradually disappearing from view, until we have to search for an existing example outside the industrial centers of the world. The verdict of the mechanical engineer everywhere when called to sit in judgment on this question is the same: "There is nothing like leather." Yet there are as many kinds and forms of leather as there are of nearly any other animal product, and while for some purposes we know other leathers are better suited, the fact is undeniable that for strength, durability, ease of repair, and adhesion oak-tanned leather captures the blue ribbon and stands superior to any others on all occasions. The first essential is found in the character of the hide. Due care must be exercised in the tanning, and a thorough and careful selection of hides must be made to insure evenness of stock. Without particular pains in this last requisite, uniformity in the belt is impossible. Or the stock must be reduced to a uniform thickness by splitting, which introduces another fault—weakness, and consequent want of durability.

Having now arrived at the point when the properly selected, tanned and sorted stock is ready for cutting and splicing, we have to decide which of several methods is best for attaching the various lengths to form a continuous belt.

There are, as I have intimated, several methods of attaching these. By thongs of lace leather. By wire hooks. By rivets and burrs. And finally by scarfing and lapping—the two scarfed surfaces being cemented under pressure. This has been adopted quite generally by Western manufacturers, and any objection to such joints which may have formerly existed are now set at rest forever through the use of more recent methods and materials. There are objections to the three methods first mentioned, which are at once simple and damaging, from a mechanical point of view. It goes without saying that a belt punched full of holes for either lacing, hooks, rivets or any other appliances for fastening is weakest at those splices, instead of being strongest. And, again, any inequality, such as must necessarily arise from any one of these fastenings, must result in undue strain on the belt, must give rise to a slapping motion, and thereby reduce the useful work of the power. We may find a still more serious objection further along.

When an important belt is properly constructed, properly proportioned and speeded, and receives the attention and care which it deserves, there is scarcely any limit to its durability. The cause of the failure of many large belts may too often be found in some one of the above particulars. Of course, there are other things to be considered. It is a mistake to figure too closely on the length or width of an important belt. Do not risk a possibility of slipping, which means heat, and will ruin the best belt made in an astonishingly short time. It was a few years since the rule among one class of belt customers to depend almost exclusively on rubber for the severe work required in saw mills. This has now fallen into disuse, and has been replaced by leather, this latter proving better adapted for this purpose. Belting for electric light machinery, to be a success, must have characteristics not necessarily found in belting for other purposes. For ordinary machinery for sawing, turning, planing, &c., there is not the positive necessity for steady motion which must exist in an electric light belt to secure satisfactory results. It is my desire to point out a few of these peculiarities and at the same time particularize some methods of prevention. Perfectly uniform motion, other things being equal, means steady, even electrical force; and this, as I understand it, means uniform, steady light. One acknowledged advantage which pertains to the electric light, more especially the incandescent form, is its steadiness and freedom from flicker; and to obtain this a uniform belt must be used. This uniformity of belt must exist throughout its entire length, not only at the portion between laps, but in the laps themselves. The presence of anything which will increase the heft or thickness of

the belt at the lap is no worse than at any other point, nor any less mischievous. No engineer would consider it an advantage to have the driving pulley out of true a quarter of an inch on one side, and yet this would have probably no worse effect upon the uniformity of the dynamo movement than additional thickness at the laps of the belt.

Another cause of irregular motion may be found in a slipping belt. A certain amount of suction (of the power known among engineers as vacuum pressure), which, of course, means atmospheric pressure, is a positive necessity to hold the belt in place, and so make its pull uniform. The more closely the belt hugs the driving pulley of course the more perfectly and quietly does it accomplish the end sought. Now, it takes but little thought to comprehend—in fact, it is apparent on sight that a belt which is lifted from the pulley every 4 or 5 feet, allowing the air to enter the space between the belt and pulley, can only produce unsatisfactory results. Experience has demonstrated that the most perfect remedy for all this irregular action, from any of the causes mentioned, is such a union of the laps as is produced by a scarfed joint, simply relying upon the cement, discarding rivets, pegs, wire, or any other form of fastening. To accomplish these results there is still one vital qualification necessary, which I have mentioned. Unless the belt has been properly stretched in the manufacture, the hard, rapid pull of the dynamo work will soon render it necessary to take out the slack. This should not be. This proper form of belt is to be had, and the electric light fraternity of the West have quite generally indorsed its use.

Of the care of belting in use a few words may not be out of place. The saturating of belting by any kind of oil is destructive. Belting stock, properly prepared, needs occasionally simply a slight coating on the grain. The dressings ordinarily offered in the market for this purpose are destructive. They are mostly of the mineral oil variety, and contain more or less of those light products of distillation known as naphtha, benzine, &c., and combine readily with many vegetable and animal products, and tend to destroy their integrity. There are belt dressings produced which not only do not injure, but really add to the life and power of the belt.

Importers and Knowledge of the Tariff Law.

An appeal from the assessment by the Surveyor of Customs at Pittsburgh of duty on certain steel crop ends was recently rejected by the Treasury Department for the reason that more than 30 days had elapsed between the liquidation of the entry and the filing of the protest by the importers. It subsequently appeared that this failure on the part of the importers was due to representations made to them by the deputy surveyor at Pittsburgh that protest and appeal need not be filed until within 10 to 30 days respectively, after notice of liquidation had been given to them. The Department was asked to reopen the case and the importers stated that they repeatedly attempted to file protest and appeal before the liquidation, but were deterred therefrom by the deputy surveyor, who represented that they would be quite in time if the protest was made after the liquidation of the entry, and that they accordingly filed protest and appeal within 48 hours after receiving notice of liquidation. Secretary Fairchild, in a letter to the surveyor in regard to this case, says that the law is imperative that protest and appeal are to be filed after liquidation, and not after notice thereof, and that it is not required that notice of liquidation shall be given to importers. He says that in this case the importers were not prevented from filing their protest within the required time, and that the statements of the deputy surveyor do not appear to have been misleading, inasmuch as protest and appeal must be filed after and not before liquidation. The importers, he says, could not be said to have been prevented from complying with the law, in any event, by the statements of customs officers, whether true or false. Importers, he adds, are bound to know the law and to comply with its provisions, unless prevented by circumstances beyond their control. The Department therefore refused to reopen the case.

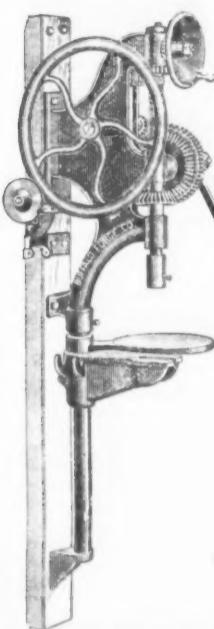
Commenting on the results of the inquiry into the recent disastrous explosion of a copper steam-pipe on the British steamer Elbe the London Engineer says: "An analysis of the copper has been made by a chemist, and no trace of injury such as might be supposed to result from the use of sulphurous fuel has been detected. We need scarcely tell our readers that sulphur has a remarkable influence in deteriorating copper. What the exact nature of this influence is not fully understood, but it is certain that fire boxes worked with sulphur fuel not only wear away rapidly, but that the metal becomes brittle. Men of considerable experience assert, again, that copper produced by gas furnaces of the Siemens type is often untrustworthy. On this latter point we are unable to express any opinion, as no such untrustworthiness has come under our personal observation. The circumstance that the copper was pure and good complicates the whole problem."

In order to prevent the rapid burning out of the front ends of boiler tubes, Messrs. Walter Hague and Wm. B. Cookson, of Pittsburgh, Pa., have devised a corrugated shield or inner cover for each tube. This shield, which may also be made with a plain surface, is to be applied in the end of each tube at the point of connection with the firebox of the boiler. It is removable and can be easily replaced when destroyed.

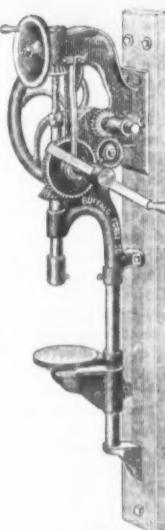
The Savannah Line has contracted with John Roach's Sons, of Chester, Pa., for a large steel freight ship, to be driven by triple expansion engines.

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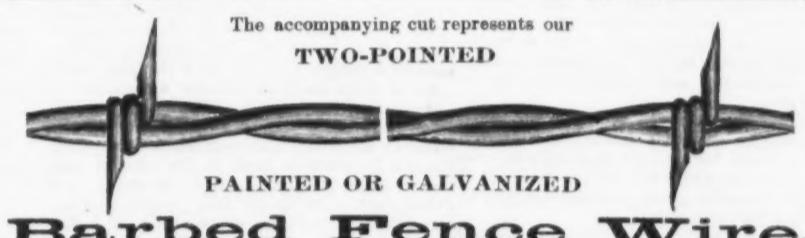
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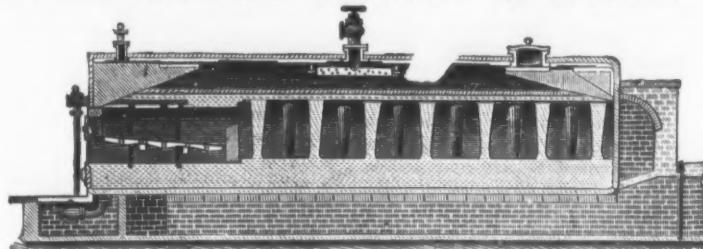
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W. F. SELLERS, Secretary. WILLIAM H. CONNELL, Treasurer.

American Tin Prospects.

H. W. Fowler, general manager of the Fowler Rolling Mill Company, of Chicago, has recently returned from the Black Hills, Dakota, to which he had gone for the purpose of arranging for the erection of a plant to develop a tin mine in which he and other Chicago capitalists are interested. A building is being erected near the mine, and steam power will be supplied sufficient to handle 50 tons of ore daily, but for the present it is intended to handle 20 tons. Mr. Fowler hopes that concentrates will be shipped from the works some time this month. They will then be smelted in Chicago, which is a comparatively simple matter, and American tin will probably be put on the market as a commercial product in January at the latest.

Mr. Fowler and his associates have pursued their investigations very quietly, and it is only during the past few weeks that he has made public what has been accomplished. His attention was called last spring to the great deposit of tin ore near Custer City, Dakota, on what is called Tin Mountain, which, thus far, no one had been able to do anything with on account of the difficulty of separating the tin from the mica schist which accompanies it. After experimenting with a quantity of the ore, which was taken to Chicago for the purpose, Mr. Fowler found that he was able, by a method of his own, to concentrate the ore. The working plant, which was then gotten up to prepare the ore at the mine, consists of a Gates ore crusher, a cyclone pulverizer and Mr. Fowler's own separator. Securing control of the property, he has gone to work to develop it.

The richness of this ore is largely a matter of conjecture, as it is distributed unevenly through the mass which has to be handled. The "concentrates" will run from 30 to 60 per cent. of metallic tin. A pig of the tin, weighing nearly 16 pounds, made from 40 pounds of "concentrates," is on exhibition in Mr. Fowler's office in the Adams Express Building, Chicago. The cost of producing the pure tin is estimated at about 10 cents per pound.

The company which has been organized for the purpose of developing this American tin enterprise, known as the Tin Mountain Company, has a capital stock of but \$150,000, or simply enough to buy the mine, put up the works, and carry on the legitimate operations. The president of the company is C. H. McCormick, of the McCormick Reaper Works; the vice-president is A. C. Bartlett, of Hibbard, Spencer, Bartlett & Co., while H. W. Fowler is secretary, treasurer and general manager.

000 gallons per day. The most celebrated is at Grenelle, a suburb of Paris, with a depth of 1802 feet and a delivery of 880,000 gallons per day, with a force sufficient to raise it 120 feet above the surface. Wells 1500 and 1800 feet deep are said to exist in the province of On Tong Kiao in China.

Foreign Markets.

EQUIVALENTS.

	Cents.
Franc, Peseta or Lira.	19.3
Florin (Netherlands).	10.2
Mark (Germany).	5.9
Milreis (Portugal).	1.08
Milreis (Brazil).	54.8
Mark (Germany).	23.8
Kilogram.	220.5
Picul.	134.

BRAZIL.

MARANHAS, October 5, 1887.—India Rubber.—Great impulse is being given to India-Rubber gathering in the forests of the Pinheiros districts, two companies have taken in hand the extraction of the rubber. Exchange is looking up, being done at 2300 @ 2340, on London, for the last mail. A cable dispatched from Pernambuco, November 11, reports a firm market there, receipts being taken as they come to hand at an equivalent of 75¢, cash, landed in New York, and all exporters are said to be buying.—*O Commercio.*

EGYPT.

ALEXANDRIA, November 2, 1887.—Petroleum.—The repeated booms for Oil in Egypt have at length met with success. Petroleum was struck in good condition at a depth of 1320 feet at Djebel-Zeid.—*Eco.*

EAST INDIES.

SINGAPORE, September 21, 1887.—Tin.—The market has been well supplied, prices fluctuating in sympathy with exchange and ranging from \$37 to \$37.55, buyers offering \$37 @ \$37.50 $\frac{1}{2}$ picul at the close. It seems doubtful if shipments will be as rather more rapid. Tonnage—Rates to London are quoted 27.6 for weight. For New York, the steamer Moray takes a little Tin at 17. The berth is now occupied by the Naupacte. For Boston, the berth is vacant. Exchange—Is weak at 3/8 for 6 months' credit. The steamer Pekin, from Penang took \$10 piculs; the steamer Glenearn from here, \$40; the Claymore, from here, \$41, and the Peshawur, \$45, making the total to the United States to date 62,845 piculs.—*Gulfian, Wood & Co.*

AUSTRALIA.

MELBOURNE, VICTORIA, October 21, 1887.—Iron.—Greater activity is noticeable at well-sustained figures in Galvanized Iron at £16.5/-, and in Fence Wire at £28.10/-—*Per cable via Europe.*

SPAIN.

BILBAO, October 22, 1887.—Iron. Ore—From England offers are continually being made to contract. Ore for delivery next year at 6.9 for Rubios Superiores, but our mining companies still hold aloof. The fact is, Bilbao Ores are this year in better request than ever before. Current prices are 6.9 for 7/3 Campañas and 9.7 @ 10/10 Rubios Superiores. The shipments so far this year amount to 3,546,257 tons, against 3,577,179 in 1886. Pig Iron—Has been in good demand, 4,995 tons having been shipped abroad, and 710 coastwise.—*Bilbao Marítimo y Comercial.*

GERMANY.

HAMBURG, November 5, 1887.—Iron.—The Rhine-Westphalian Iron market remains firm. Since the recent advance of 1 mark $\frac{1}{2}$ ton in Foundry Pig Thomas has also improved 2 marks. Finished Iron, staff, and a good demand is kept up for Rail makers. The price is no higher than before. Steel Rail makers are held in high esteem by the constant fear of being undercut by their Belgian competitors. But for Cockerill's low offers the Northern indications in Germany for 58,072 tons Rail and 14,000 tons Sleepers would have gone 10 marks $\frac{1}{2}$ ton higher. Quotations at the close are 54 marks for Foundry Pig; 46 for Forge ditto; 51 marks for Spiegel, and 53 marks for Luxembourg Pig. Markets are steady at 115; Beams 115, and Boiler Plates 109 marks $\frac{1}{2}$ ton. In Upper Silesia, in spite of the advanced season, rolling mills are fully booked. There are still large orders for Sheets yet to be filled. Meantime no noteworthy change has occurred in Pig Iron. Forge is moderately active and unaltered. Foundry, at a slight improvement, sells well. The Wire line continues quite active, and the tendency is upward. At the late Hagen meeting a general raising of 10 marks $\frac{1}{2}$ ton in Wire Nails was resolved upon. *Metals.*—Lead exhibits great firmness. The market also shows of Copper, but the advance asked checks business. Spelter is well sustained at the recent improvement. Iron for shipment is weak.—*Borsenzeit.*

HOLLAND.

ROTTERDAM, October 31, 1887.—Tin.—Great firmness is noticeable at 63.50 @ 70. Bilbton, November delivery; spot ditto, 70; Banca, spot, 70.50 paid, while distant Bilbton futures are quoted 68.50 nominally.—*Koch & Vlierboom.*

BELGIUM.

BRUSSELS, November 5, 1887.—Iron.—The Belgian Iron market has, on the whole, remained tolerably firm. Carriers, hitherto complaining of a dear city in orders, are now busy in attending to the great increase in the demand of the Government railroads, some 1300 to commence which will be soon followed by additional orders. Beams are likewise as active as they were at any time during the year at the figures fixed by the syndicate. Steel Rails, although still depressed by foreign competition, at any rate are moving off freely. Pig Iron is steady at 4.60 francs $\frac{1}{2}$ 100 kg; No. 5 Foundry, and 4.30 Forge, spot and to arrive. At the rate makers generally do not seem in the least apprehensive as to the near future, and as to how the fall winter season is to be divided, which, for there is export trade enough, should at any time the domestic demand temporarily flag, but of this there are no indications, the Government having its new army requirements to attend to besides what is wanted for the State railways.—*Moniteur Industriel.*

FRANCE.

PARIS, November 5, 1887.—Metals.—Since our last report our market has been irregular, but the tendency onward in sympathy with England and Holland. We quote at the close nominally in francs $\frac{1}{2}$ 100 kg: Copper—Chill Bars, 111 @ 116.25; Ingots and Slabs, 118.75; Best Selected, 123.50, and pure Corocoro Ore, 117.50. Tin—Banca, 325; Bilbton, 330; Straits, 315; Australian, 317.50, and English, 315. Lead—31 @ 31.75, and Spelter, 42.50 @ 43. Iron—Our own market continues unsettled at 11.50 francs $\frac{1}{2}$ 100 kg. Beams: 12.50, Merchant, and 12.75, 5 francs. Old Rails. Vaudreuil reports a quiet market without much prospect of a speedy revival; meanwhile the rolling mills are booked for part of the winter, and Boiler makers also have a steady run of orders. The Denain and Anzin works received a Government order for Plates and Angles, while the Dervaux works are filling an order for railroad material for the Northern Company. At Charleville the Stove branch is very active; this may also be said of Finished Iron, Nails and Carriage Hubs. Altogether, matters look a little brighter in the Iron regions of France.—*Moniteur des Intérêts Matériels.*

AUSTRIA.

VIENNA, November 2, 1887.—Iron.—In Austria-Hungary generally there has been no increase of activity during the week, but advices are more favorable again from Bohemia, where Witkowitz Pig Iron has superseded English. While Merchant is not in greater request in Austria proper, thin sheet are in demand. Manufacturers are except bus by breweries and sugar houses. In Hungary the demand for finished is gradually flagging, as is usually the case at this time of the year; dealers are underbidding makers therein. The hardware fall trade has been satisfactory. We quote on a steady market, in francs, $\frac{1}{2}$ ton: Pig, 38 @ 46; Merchant, 105 @ 120; Sheets, 140 @ 175, and Beams, 117 @ 127. Metals have been irregular. The quote nominally: Copper, 55.50 @ 59.50 $\frac{1}{2}$ 100 kg; Lead, 18.75; Spelter, 20.50; Tin, 141 @ 142; Antimony, 44, and Quick silver, 22.—*Handel's Journal.*

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VALUABLE BOOK ON
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Lake Superior Charcoal Pig Iron.

Three meetings have now been held by the charcoal pig iron manufacturers of the West, with a view to securing better prices for their product. The original intention of the promoters of the movement was to include all the manufacturers of charcoal pig iron west of the Allegheny Mountains and north of the Ohio River, but it was found impossible to interest the manufacturers of anything else than Lake Superior charcoal pig iron, and the movement has been consequently narrowed to that field. The furnaces interested are located in Michigan and Wisconsin, and their product is mainly sold through agencies or offices at Chicago, Detroit and Cleveland. The consumers of this iron, however, are scattered over a large part of the country, embracing principally manufacturers of malleable iron castings, cast-iron car-wheels and castings for agricultural implements. During the past year a considerable quantity of this iron has also been used in the manufacture of steel rails, and a great deal of it has gone into ordinary castings, including a variety of work for which cheap pig iron is commonly sought.

Excluding the owners of furnaces, which are not likely to be started under ordinary conditions, there are twenty one companies engaged in this branch of manufacture. So small a number of manufacturers it would seem could easily come together and make arrangements to sustain prices and always secure a profit on their operations, provided that their product is really of such character that a demand will exist for it, without regard to the price asked. This proviso seems to be the obstacle in the way of a thorough union of all the parties interested. It is alleged by those who are active in endeavoring to organize the scheme to control prices that Lake Superior charcoal pig iron is so indispensable for a number of industrial uses that from \$3 to \$4 per ton over the price of coke pig iron could easily be obtained if it were insisted upon by all the producers. They point to the record of past

years, when there was always a difference of at least this much between the two kinds of iron, and sometimes a great deal more than this. They also claim that the condition of charcoal iron prices for the past two or three years, in which these prices have run along parallel with coke iron prices and occasionally below them, has been one of unnatural depression caused by influences, which should not have been permitted to exert so much weight. In this view of the situation it is insisted that the trade should not be longer allowed to drift, but that a combined effort should be made by the parties interested to elevate the price of Lake Superior charcoal pig iron to its rightful position in advance of that of coke pig iron.

A dissenting opinion is, however, held by a very considerable part of the Lake Superior charcoal pig iron makers. They assert that the old-time difference between the price of charcoal and coke pig iron arose from a number of circumstances, chief among which was the inferior quality of pig iron made with mineral fuel as compared with that made with charcoal. This fault has been largely overcome by the improved methods of manufacture now in use, by the more careful selection of ores and, generally, by the application of advanced scientific investigation in adapting the product to a special purpose. It can no longer be said, as was once the case, that charcoal pig iron is better for any purpose than any kind of anthracite or coke pig iron. For a comparatively limited range of uses charcoal pig iron is undoubtedly essential. The manufacture of malleable castings is one of these. Car-wheels, however, can be made with other charcoal iron than Lake Superior used as a basis. Castings for agricultural implements are not of such a character that a very high price would be paid for Lake Superior charcoal pig iron to put into them, if good coke iron could be had at a reasonable rate. The use of Lake Superior charcoal pig iron would very probably not be abandoned entirely by this branch of trade on this account, but the quantity would undoubtedly be much reduced. As to the use of charcoal pig iron for manufacturing Bessemer steel rails, the demand this year has been abnormal and cannot be expected to continue up to its recent proportions, after the manufacturers of rails find the demand for their product within their capacity for the production of pig iron. The quantity of charcoal pig iron needed for filling rail contracts specifying that a certain proportion of such iron shall be used is quite small, as compared with the total quantity of such iron purchased this year. The fact is recognized by those most immediately interested in this branch of trade that the great demand for charcoal pig iron for Bessemer purposes was simply a part of the general demand for Bessemer pig iron caused by the activity in the steel rail trade. Proof of this statement is exhibited in the price obtained for the charcoal pig iron thus used, which was practically the same as the price ruling for coke Bessemer pig iron. It is expected by those most conversant with this matter that in 1888 not more than one-fourth as much charcoal pig iron will be used for Bessemer purposes as has been used this year. With regard to the demand for Lake Superior charcoal pig iron for general foundry use, it is stated that this has been larger this year than usual, partly because of the great demand for all kinds of iron and partly because the price asked has varied but slightly from that asked for coke iron. Finally, there is a decided reluctance to make weekly reports of sales and prices realized, which is an essential part of the plan of the promoters of the movement, inasmuch as it is felt that very important details of strictly private business would thus be disclosed without securing much benefit, if any.

The views of the trade being thus set forth *in extenso*, it will be observed by the consumers of Lake Superior charcoal pig iron that at present there seems to be but a faint prospect of an agreement being reached which will affect prices. As long as a considerable part of the manufacturers believe that the Lake Superior charcoal pig iron trade cannot be conducted as a separate and independent branch of the iron trade, but that the interests of all branches are inextricably interwoven, so long will anything like a combination be impossible. Meanwhile the law of supply and demand will have its usual full force, and the price will fluctuate in obedience thereto.

Under the Immediate Transportation act, goods are transported from ports of first arrival to ports of destination unappraised. The advantages of this system to merchants in the interior are being appreciated more and more, as will be seen from the following table, computed by the Bureau of Statistics:

Fiscal year. Packages. Invoice value. Estimated duty.
 1879..... 249,811 \$8,745,663 \$4,284,890.54
 1880..... 326,901 18,125,726 6,109,710.85
 1881..... 31,901 1,416,254 600,000.00
 1882..... 330,183 21,440,540 10,186,940.14
 1883..... 1,130,619 36,283,929 18,225,690.46
 1884..... 1,423,262 27,896,567 12,323,879.82
 1885..... 1,122,528 25,860,803 11,751,109.34
 1886..... 1,374,224 29,255,104 14,403,996.87
 1887..... 1,619,287 37,029,264 20,025,680.00

In all, 45 cities were points of final destination, Chicago leading with \$10,876,545 in 1887, against \$9,133,609 in 1886. There was a notably large increase in the shipments via Baltimore and other Atlantic ports of iron and steel, and especially of wire rods.

Late Developments in Peru.

In March last, in an editorial headed "Peruvian Progress," we alluded to a contract which Mr. Michael P. Grace, of the firm of W. R. Grace & Co., New York, made in February with the Peruvian Government on behalf of its foreign bondholders. Mr. Grace soon after proceeded to London, accompanied by the Peruvian Commissioner, Dr. Aranipa, stopping a couple of days at New York, and while here expressed himself on the subject about as follows: "The claims against Peru amount to about £32,000,000, part of which, however, the bondholders think the adjoining republic of Chili should pay, that republic having in dismembering Peru taken a large portion of the guano and nitrate of soda deposits and customs duties, which were hypothecated to the bondholders. Having been sent as an attorney for the foreign bondholders, and having secured a contract from Peru, some conditions of which, however, were not within the limit of my instructions, the Peruvian Government decided to appoint Dr. Aranipa a commissioner to accompany me to London in order that a satisfactory solution might be arrived at. The scheme of the contract which has been proposed by Peru advises the transfer of all Peruvian railroads to the bondholders for a definite number of years, the transfer of guano, the right to work mines, the cession of large tracts of land for the purpose of encouraging immigration and for the benefit of corporations, the right to navigate rivers, and a cession of an income from the Custom-House. In exchange for these offers, the bondholders are to extend the railroads and cancel all their claims against Peru. This project will bring prosperity to Peru and develop her resources. These are very rich and will become remunerative to the bondholders. I have no doubt of the adoption of the plan. It seems to be the only way to benefit the country, and at the same time to compensate the bondholders for the enormous amount of money advanced." As Mr. Grace had foreseen, everything went smoothly, so as to enable President Cáceres in his message to Congress, of July 28, to say: "The arrangement initiated in Lima by Mr. Grace has been finally concluded in London by Señor Aranipa, as the representative of this Government, as is shown by the contract, which will be submitted for your consideration by the Minister of Finance. The Government aspires to a re-establishment of Peru's credit in the world by opening a way to foreign capital and industry, for which there is ample field, and by which there will be brought progress and prosperity."

The publication in Chili of the text of the contract caused general excitement in that republic. Within five days eight of the principal newspapers of Valparaíso and Santiago devoted a number of editorials to the subject, and the tone of intense disapprobation was unanimous. It was declared that the Chilian Government, together with the other South American powers, should instantly interpose to save Peru from the ignominious fate to which she was destined, should the contract be approved by Congress; that the result of such a burden would be the establishment of a new East India company in Peru, and that her independence and autonomy would be seriously threatened. The Chilian minister at Lima was thereupon ordered by his Government to lay in his protest against the ratification and carrying out of this contract. Under this pressure the Peruvian Government yielded, and withdrew the contract in its present shape, in order to so modify it as to remove the clauses considered objectionable by its powerful neighbor. Should the bondholders still adhere to the compact thus modified the Peruvian Government may be able to prevail on Congress to sanction it. Chili bases her objections on two of the principal clauses of the document. First, the implied assertion it contains that she is responsible for one half of the Peruvian foreign debt, as she has seized the property by which that obligation was guaranteed, whereas by the treaty of peace she declared that she would hand over to the bondholders one-half of the net proceeds of the guano she might sell abroad, and the payment of the Peruvian debt was never alluded to. She holds that if a contract of an international character, such as this is, should be formally ratified, containing such an implied declaration of her responsibility, the question would become a grave one. Peru was, therefore, formally called upon to declare that Chili is in no way liable for Peru's obligations on account of her conquest of Tarapacá and had not compromised herself to pay one-half of the foreign debt of Peru. The second of the Chilian objections is based on the immigration of Europeans into Peru proposed in the contract, and the large grants of land to be given to the company. The Chilian writers declare that it is nothing but handing over the independence of the country to a foreign power; that the principle established by the United States, and known as the Monroe doctrine, would be invaded by such a concession, and it was implied that Chili should take the initiative in protesting against the proposition.

It should be remarked that opinion in Peru is divided on the subject of the Grace contract. The correspondent of the *Diario de Barcelona*, writes from Lima under date September 10, stating that the opposition press calls the contract monstrous, and that

it would be bartering away for a trifling the independence of the country to foreigners. Meanwhile, the commission of engineers and mining experts appointed by the Peruvian bondholders at London arrived at Callao, Peru, in October last from Panama, intending to immediately proceed to examine carefully the railways. A report will be made regarding the capacity of the lines, and the probable increase in business in case of their being extended as originally planned. The commission had an interview with the President of the Republic, in which every possible facility and all assistance in the projected work were promised. But even in connection with this matter of the railroads a difficulty has arisen. The action of the House of Deputies of Peru in authorizing the Executive to assume the possession and management of the Southern railways, in contravention of contracts entered upon by the parties now holding them with recognized Governments of Peru, has not been seconded by the Senate, and it was stated that foreign Governments, whose citizens have vested rights in the railways referred to, have cabled instructions to their representatives at Lima to protest formally against any similar violation of contracts. It is evident that some considerable time will pass by ere all can be smoothed down and Peru fairly gets under way again in a manner holding out prospects of gradual material regeneration, while at the same time satisfying the bondholders of her ability without encroaching upon the rights of anybody.

Combinations in the German Iron Trade.

During the past few years there has been a craze in the German iron and coal trades to form combinations and pools of all kinds in bewildering variety. They have tried the ordinary association, bent on simply fixing prices without limitations of any sort; they have wrangled over allotments, have imposed penalties, given wide powers to commissioners, and have appointed selling agents through whose hands have gone all dealings between middlemen and consumers on the one hand and producers on the other. Many of them have been temporarily successful, but in the long run a period of armed neutrality full of underhand maneuvering for better position has been followed by bitter and costly warfare. Still the general belief in the efficacy of concerted action among producers has not been shaken, and even now negotiations are said to have been completed to pool the rolled iron trade of the whole country.

The course of some of the past combinations is well illustrated by those in the coal trade of Westphalia. In 1879 a large majority of the coal operators formed a pool, agreeing to limit production to specified amounts and to adhere to certain minimum prices. It had little effect, because the quorum of 90 per cent. of the operators of the district was never reached. Still the combination was renewed from year to year until 1882, when it was found absolutely necessary to modify the arrangement. The members were asked to agree not to produce more than five per cent. in excess of the output of 1881, and the penalty for mining above allotment was reduced from 25 cents per ton to half that figure. This brought in a large number of operators, but it was found practically impossible to keep them within the allotments, and the trade went from bad to worse, while many withdrew disgusted, so that when it came to the allotment for 1884 on the basis of 1883 product, only 68 per cent. of those in the trade showed a disposition to join. Some months later, the crisis became so acute that 107 operators, 91 per cent. of the whole number, replied to an appeal by the committee, but 38 succeeded in securing special privileges. In spite of a penalty of 50 cents a ton for excessive output, the quantity mined showed an increase of 2 per cent. at the end of the year.

A more successful experiment was that of the colliery owners of the Dortmund district. In 1885 the majority of the miners of bituminous coal and coke appointed an agent to supervise the sale of their product, and the payment of the Peruvian debt was never alluded to. She holds that if a contract of an international character, such as this is, should be formally ratified, containing such an implied declaration of her responsibility, the question would become a grave one. Peru was, therefore, formally called upon to declare that Chili is in no way liable for Peru's obligations on account of her conquest of Tarapacá and had not compromised herself to pay one-half of the foreign debt of Peru. The second of the Chilian objections is based on the immigration of Europeans into Peru proposed in the contract, and the large grants of land to be given to the company. The Chilian writers declare that it is nothing but handing over the independence of the country to a foreign power; that the principle established by the United States, and known as the Monroe doctrine, would be invaded by such a concession, and it was implied that Chili should take the initiative in protesting against the proposition.

The chief impediment to treaty revision is the apparently inseparable connection between tariff questions and extra-territorial privileges, which latter the foreign powers cannot agree to surrender without substantial equivalent. It is understood that all through the series of conferences at Tokio the Japanese ministers were ready to open additional treaty ports, but in no case could they, nor would the nation at large consent, to a further alienation of the domain of the Mikado akin to that from which the country in the past has suffered such deep humiliation. The final blow under which the conference was abruptly dissolved at the close of the summer, only a few weeks ago, was when the envoys present demanded that the proposed Japanese code be first submitted to them for approval, and that no amendment or modification whatever take place during the next fourteen years

of the works in the three districts, Rhine and Westphalia, Silesia and Central Germany were holding aloof a few weeks since. The mills in the Saar district, which have been developing most rapidly of late, and which are unable to sell in France on account of low prices there, have been the sharpest competitors of late, and yet the other districts evidently felt that they could overtake them, offering them only a small percentage. On the other hand, the Silesian mills have succeeded in getting more than was their due.

American manufacturers and consumers could look upon this struggle complacently, were it not for the fact that one large interest in this country—the wire trade—looks to Germany for the bulk of its raw material. Rumors of efforts to form a combination of the German wire rod manufacturers have come to hand for some time past, and prices here have not receded in proportion to the fall in billets. Their future course here must depend largely upon the success of the movement above alluded to.

Failure of Treaty Revision in Japan.

Recent cable advices inform us of the indefinite postponement of the conferences which at intervals for several years past have been held at Tokio between the Japanese Ministers and the envoys of foreign powers there assembled, with the object of effecting a radical revision of existing treaties. The effect of such an abrupt termination, just at the moment when agreement was supposed to have been reached, was attended with a violent collapse of speculative values, all kinds of visionary projects having been fostered of late in the belief that speedily the whole land would be open to foreign investments. At the capital suburban lands were advanced to fabulous estimates of value. The reaction spoken of was so violent that the Japanese Minister of Foreign Affairs became the subject of strong popular odium and at last surrendered his post.

For 20 years Japan has held out her hand seeking recognition among the independent powers. She sighs for complete sovereignty, but, under a treaty framed just as she was emerging from a state of semi-barbarism, and which is too rigid in its provisions for adoption in her present advanced stage of development, she has remained in a state of quasi-independence not only galling to the national sensibilities, but repressive of her best aspirations. Not unreasonably she asks for absolute and undisputed jurisdiction within her own domains, including a vital point—namely, power to fix the tariff on imports and otherwise to regulate the customs collections. The so-called extra-territorial clauses discriminate sharply between the five treaty ports and the national domain at large, and establish within certain prescribed limits a consular jurisdiction in essential particulars entirely independent of the central authority at Tokio. Japan claims in effect that foreigners should be answerable in some sense at least to such laws as the Government may enact; whereas, under the treaty, the five principal ports are practically European territory. Concessions so broad are considered very derogatory to the national honor and no longer permissible. But far more galling and far more obnoxious, because of its paralyzing influence upon trade, industry, and all the material interests of the country, is that feature restricting the amount of duties that shall be collected from imports—the result of the adroit diplomacy of Lord Elgin in 1858—5 per cent. ad valorem being the ruling rate imposed on manufactures of cotton and wool and a wide range of general merchandise. The evident injustice thus inflicted appears in the fact that several lines of domestic manufacture in which the Japanese excelled have been crushed out of existence. Furthermore, the aggregate receipts from customs' revenues are only about \$3,000,000 annually, bearing an insignificant relation to the annual revenues and expenditures of the country, notwithstanding the fact that the large aggregate of 1,400,000 tons of foreign shipping annually enter Japanese ports. In the exigency thus raised the Government is compelled to resort to an oppressive land tax, yielding no less than \$58,000,000, weighing heavily upon the entire agricultural interests. Another pointed illustration of the practical working of the tariff regulations of Japan may be observed in the maintenance of an expensive lighthouse system throughout the coasts of the empire, to which foreign commerce contributes absolutely nothing.

The chief impediment to treaty revision is the apparently inseparable connection between tariff questions and extra-territorial privileges, which latter the foreign powers cannot agree to surrender without substantial equivalent. It is understood that all through the series of conferences at Tokio the Japanese ministers were ready to open additional treaty ports, but in no case could they, nor would the nation at large consent, to a further alienation of the domain of the Mikado akin to that from which the country in the past has suffered such deep humiliation. The final blow under which the conference was abruptly dissolved at the close of the summer, only a few weeks ago, was when the envoys present demanded that the proposed Japanese code be first submitted to them for approval, and that no amendment or modification whatever take place during the next fourteen years

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without receiving the further sanction of the powers. The position of Japan is most unfortunate and must awaken the sympathies of all who desire her continued advance toward the zenith of her possible development. It is gratifying to know that United States representatives in Japan have throughout been sturdy friends of revision guided by an honorable diplomacy rather than by that self-seeking which is oblivious to the welfare of the "parties of the other part." They accepted in good faith the assurance of the leading Japanese statesmen that any code originating with their approval would afford all reasonable guarantees for the protection of foreign interests in that empire. Events proved that certain special interests were too clamorous and exacting to be so easily conciliated.

Trusts and Combinations in Trade.

If it were not perverted to form the basis of vicious arguments, those interested in the iron and steel trades could allow the curious medley of misinformation printed in the daily newspapers to pass with a smile. The crass ignorance on industrial topics displayed by editorial writers on the greatest dailies in the country is appalling, but it becomes a serious matter when it is coupled with a discussion of principles the acceptance or rejection of which must finally lie with the business community generally. Of late the daily press has been oppressed with the dangers of the modern trust, and has seen in every concerted movement of manufacturers an effort to oppress consumers by methods similar to those of the Standard Oil Company. It may be confessed that the success of that corporation has caused its system to be closely studied by manufacturers in the wire, steel and metal trades, as it has in other industries. But there is not in the whole wide realm of the industries in which our readers are interested a single corporation of the kind worthy of the name. The only one seriously talked of, the Lead Trust, and that, so far as the production of the crude metal is concerned, does not represent more than 5 per cent. of the total make, while its position, so far as manufacturers of the metal are concerned, is now and will remain far from commanding. There are in existence in the wire, metal, and hardware trades in the United States, as there are in every country, a number of combinations more or less successful. With the majority of them a brief, troubled career simply proves that history repeats itself, and those now in existence, with a very small number excepted, are languishing. After a pretty decided failure with an earlier organization of this kind, the manufacturers of open hearth and crucible merchant steel have resolved to make another effort to put an end to unremunerative prices by a combination embodying features which, it is hoped, will do away with the disintegrating influences of their former association, the majority—not all—of the large manufacturers having joined it. The metropolitan press has seized upon the fact that a meeting for organization has been held in this city, and straightway proclaims a great "Steel Trust." We can imagine the amazement of what is after all only a small part of the steel industry of the country at finding greatness thus thrust upon them. We are gravely told that this new Steel Trust is the most formidable of all competition-killing "combines," that it is supported by enormous capital, and that the time has come when the poor oppressed farmer should rise in his might and crush these cruel monopolists. For a while the country will echo with the cries against the imaginary Steel Trust, while the Merchant Steel Association of the United States will struggle with the obstacles coming up against the maintenance of fair prices for their goods.

The winter outlook for cheap coal is by no means cheering. All the miners working in full force through the autumn season would yield no surplus in excess of a moderate reserve stock. But the virtual closing of the Lehigh Valley region at once cuts off about 25 per cent. of the total ordinary coal production. Meanwhile, operators tell their customers to be patient, that there is plenty of coal, and that before navigation has closed for any length of time the accumulated orders will be gradually worked off, making all happy again. After all, misgivings sometimes creep in, suggested by the possibility of a fuel famine in mid-winter and the recent action of the Executive Board of the Reading employees in convention at Shamokin, refusing to handle "scab" coal, is by no means reassuring. They claim to be masters of the situation under an existing agreement which gives them 8 per cent. advance on foreign wages, and they hope to induce the 60,000 miners of the Wyoming region to co-operate in liberal assessments to sustain a common cause for an indefinite period. On the part of the company the question may be asked: How can they avoid a rupture with their men? Have they simply to acquiesce in a refusal to carry freight offered them for transportation beyond the State line? Whatever may be true touching the alleged hardships of the Lehigh Valley miners, the Reading men have no such grievance, but are prepared to join hands all the same in damaging coal consumers at large as a means of forcing the Lehigh operators into the demanded concession. The Interstate

law commissioners would do well to examine this matter without delay. A conciliatory adjustment of a difficulty already of nine weeks' standing is by no means impossible, and would be a common boon. If the question in the concrete is simply whether the several companies shall surrender the control of their business to an outside organization acting under assumed authority, that, too, may come within the scope of useful inquiry.

Equalization of Freights.

To the Editor of *The Iron Age*: In your last issue, under the caption "Equalization of Freights," you publish a letter to the stove trade from General Secretary D. M. Thomas, dated, Chicago, October 18, 1887, and also a petition to the Interstate Commission, objecting to the complaint of the Board of Trade and Transportation, and of myself, representing many hundreds of retail merchants, in which we ask the commission to pronounce against the present classification as giving undue preferences by putting excessive differences between carload and less than carload shipments on certain articles. In this letter Mr. Thomas says: "Should a uniform classification for all quantities be adopted, I will apply to the materials you use, such as pig iron, coal or coke, and sand, as well as the goods you ship. As others in kindred lines of trade may be laboring under the same misapprehension as Secretary Thomas—that we are opposed to all railroad rates—it may be well for me to state our position briefly, with some of the reasons therefor:

In the first place, the controversy at present is limited to the West-bound traffic, which, until April 1, was always treated by the railroads separately from the East-bound. The difference is fundamental, and we think the attempt to combine these two classifications a mistake. The East-bound tonnage is two or three times as heavy as the West-bound, and is of a totally different character. The former consists principally of grain, provisions and lumber, of which the commercial unit of sale is a carload. We expressly except such articles, and such as are shipped in bulk, from our complaint. This leaves out the sand, coal, coke, &c., mentioned by Mr. Thomas. Turning now to the West-bound traffic: We ask that these shipments be treated on their own merits, independent of the East-bound rates. Because the railroads think 25 cents per 100 pounds low enough on breadstuffs for hauling from Chicago to New York, it does not follow that stoves and other Eastern manufacturers should not under any circumstances be given a less rate than 25 cents from the East to Chicago; and yet this is practically the effect of combining the classifications so that 25 cents is the lowest rate on the tariff. Nor is it always necessary that iron products should take the same rate in both directions. Circumstances might make this very unjust. Over and above these considerations of trade, the fact is, that half the cars go West empty, and a low rate may yield a good profit when necessary to be made. We therefore ask the commission in considering this question, to separate the East and West-bound traffic and classification and to confine their attention to the West-bound.

Leaving out of view such articles as are usually shipped in bulk or of which the carload is the commercial unit of sale, we believe that on that large class of articles known as "miscellaneous," or "house," or "jobbers'" freight, which are seldom or never shipped in bulk, but which are distributed by our railroads to every town in small lots, there should be one rate, regardless of quantity. The railroads, for 25 years made no carload rates on staple goods West-bound, with few exceptions, until this year. On April 1 they made large differences—so large that my clients, the retailers, think the railroads must have intended to perpetuate, under the guise of classification, and in the very teeth of the Interstate Act, that very favoritism to large shippers which had been carried on by means of special rates and rebates, and which favoritism was one of the reasons for the Act. Let me illustrate the situation by the rates on sugar, perhaps the first in importance of our great staples. The rate from Boston to Chicago is 25 cents in carloads of 24,000 pounds, and 35 cents when in less quantity. No retailer can buy so much of any one article. The difference in rate is 10 cents per 100 pounds or 1-10 cent per pound. The jobbers' usual profit on sugar is 1-10 cent per pound. When, therefore, we remember that the Western jobber can buy sugar from the Boston refiner at the same price as does the Boston jobber, it is easy to see that the interior jobber cannot only charge the retailer the usual profit of 1-10 cent, but, in the 1-10 cent difference in freight besides. In other words, the lack of competition compels a retailer to pay two profits to the near-by wholesaler. If this difference in freight was done away or reduced, it would be no injustice to the Western wholesaler, for he could still make his usual job profit. Other goods are not sold on so close a margin as sugar, but the same discrimination will be found in excessive differences in freight charges for quantity in all lines of trade. It is, in fact, an out-and-out preference for the interior jobber which he does not need, and which the retailers near him consider undue, and, as such, forbidden by the law. My clients repudiate entirely the idea that we are favoring Eastern jobbers. We are only trying to secure competition for our trade, which is best attained by "a fair field and no favor." This, as we understand it, is the American idea, and we ask the commission to decide the question without favor to any wholesalers anywhere, no matter how many petitions they may put in against each other.

The complaint of the Board of Trade and Transportation, after quoting railroad testimony to the effect that railroads perform a delegated function of the State and that the State treats all citizens alike at the custom house or post office and on the turnpike without considering quantity, goes on to ask "If your commission decides that this would be unreasonable, that you will recommend and enforce the establishment of

reasonable differences, define them, and where a doubt exists as to what is reasonable, that the smaller shippers who constitute the vast majority, be given the benefit of that doubt." To which entirely fair proposition we give our hearty assent. Whether a carload costs a railroad less than a smaller quantity, is a complicated question into which I shall not now enter; merely observing that if so it is strange that our railways should have continued that practice for 20 odd years on West-bound traffic; also asking why under this theory there are now no carload rates on dry goods, hardware, boots and shoes, butter and tobacco.

I have only space for a word upon the question of wholesale and retail which the petition of Secretary Thomas brings prominently forward as the great principle of trade which should be applied to transportation. Trade and transportation are not identical and scarcely analogous. The laws of supply and demand regulate trade evenly, beautifully and exactly. If the price of one article goes too high we can use another or go without it altogether. But we are obliged to use the railroad whether the price is high or not. The principles which regulate trade fail when applied to transportation. Again, a merchant sells at lower price by wholesale in exact proportion as his expenses are decreased thereby, and this also regulates itself; but differences in tariffs are arbitrary and require examination. What should be the basis for differences in freight charges according to quantity? If a carload, why not a further reduction for train loads? if for a carload of 24,000 pounds, what is to prevent the minimum weight being advanced to 50,000 pounds, the capacity of the new cars? and under all these continued reductions where will the end be, and how will the retail merchants fare? That is the question with which the retailers are now concerning themselves, and they are opposed to any tendency which may lead to the concentration of any line of trade hopelessly in the hands of large capitalists. Differences in freights between large and small shippers, not warranted by differences in cost of transportation, are the first steps in that direction, and if such differences amount to a commercial profit of themselves, they are opposed to the whole spirit of our Government, and as such should be condemned by all good citizens.

THOS. L. GREENE,
Merchants' Freight Bureau,
143 Chambers street, New York.

Meeting of the Bessemer Merchant Steel Association.

(By Telegraph to *The Iron Age*.)

PITTSBURGH, PA., November 16, 1887.

A preliminary meeting of the Bessemer Merchant Steel Association, which is in process of organization, was held in the Monongahela House, Pittsburgh, on Tuesday, the 15th inst. The following firms were represented: Jones & Laughlin, Limited, and the Linden Steel Company, Limited, of Pittsburgh; the Cambria Iron Company, of Johnstown; the Hartman Steel Company, Limited, of Beaver Falls, Pa.; Sweet's Mfg. Company, of Syracuse, N. Y., and the Troy Steel and Iron Company, of Troy, N. Y. A number of letters and telegrams were also received from other manufacturers in which their co-operation was promised. The object of the association is to form a new classification of extras on Bessemer merchant steel. Such a classification was prepared, which will be submitted at a future meeting of the association, to be held at the Monongahela House, Pittsburgh, on Thursday, December 1. The Merchant Steel Association of the United States, which is composed of the crucible and open-hearth steel manufacturers, will also meet in Pittsburgh on that day, and the associations will hold a joint meeting and act in harmony with each other. The following officers have been elected by the Bessemer association: President, W. L. King, of Jones & Laughlin, Limited; treasurer, L. H. Bonner, of the Cambria Iron Company; secretary, R. H. Johnston, of New York City.

American Society of Mechanical Engineers.

The following queries have been presented for discussion at the forthcoming meeting of the American Society of Mechanical Engineers:

What is the best form of pump to use with driven wells where lift is 10 to 20 feet and air is likely to get into the suction? Should the pump be single or duplex, and with piston or plunger?

Have you used driven wells successfully? Of what sizes and depths, and singly or in groups?

Are roller bushings expedient in journals at low velocities and under high pressures?

What is the best material for lining brake straps on elevators, cranes, &c.?

What is the best way to secure tight fit of set screws tapped into heavy parts of a machine?

How much should be removed from the edges of punched or sheared steel plate to cut away the injured metal?

Have you used power molding machines successfully in the foundry?

What makes the best molds for complicated steel castings to secure solidity and freedom from shrinkage cracks?

What is the effect of adding small per cents of wrought iron or steel scrap in the foundry cupola or ladle?

What kinds of pig iron give the best results in light castings where easy tool treatment is the essential rather than strength?

A new dredging boat, built for the Pulsometer Pump and Dredging Co., of New York, for general dredging purposes, was launched in Jersey City a week or two ago, and will be ready for work in a short time. The dredging machinery itself, with which the boat will be fitted, is of the simplest kind, and is made according to the designs of Mr. G. F. Badger. These, as some of our readers may remember from an account published about two years since, embrace

the use of a pulsometer, which directly pumps the sand, mud, gravel, or whatever other material of a similar character the dredging ground may offer, through a suction pipe provided with a specially designed digger and strainer into a line of troughs. By means of these the semi-fluid material is easily conveyed to any desired or convenient dumping ground. Experiments, we understand, have conclusively shown that the pulsometer is capable of pumping a relatively very high percentage of solid material, and, moreover, with a reduced working cost. Under the circumstances, the company's further operations will be looked forward to with much interest.

WASHINGTON NEWS.

(From Our Regular Correspondent.)

WASHINGTON, D. C., November 15, 1887.

Ex-Speaker and Mrs. Carlisle arrived in Washington to day for the Congressional term. The ex-Speaker had proposed a brief trip to Florida before the assembling of Congress, but abandoned that in deference to the wishes of the President to hold further consultation with him respecting the subjects which engrossed their attention at the Oak View conference in September. At that time it was understood that another meeting would be held before Congress got together. That meeting will now take place, and the tariff policy of the Administration, as far as proposed legislation is concerned, will be put in definite shape for recommendation in the annual message of the President. Ex-Speaker Carlisle gives it as his opinion that the recent elections, as far as the Democratic party were concerned, were not affected by the tariff movement as indicated in the President's consultation with himself and others. That New York gave an increased majority, and Ohio never counted as a Democratic State, had not weakened their chances on the general issue.

The ex-Speaker is also here upon the advice of his friends to look after the contest which his opponent in the field is making to oust him from his seat in the next House. Thoebe has put in all his papers and Mr. Carlisle has been notified to answer. There are several points involved which may increase the complications growing out of Mr. Carlisle's candidacy for re-election to the chair of the House of the Fifty-first Congress.

The protection Democrats propose to have a conference here some time next week. They will then be able to agree upon a plan of concerted action on the question of the organization of the House and the personnel of the Committee on Ways and Means. They hold the key to the situation. Eight votes would change the result on the Speakership, but they can count on the support of from ten to thirty on that protection issue. The labor Representatives will doubtless be thrown to the front on the issue of organization against Mr. Carlisle. They claim to have sufficient numerical strength with the Republicans to force the election of a compromise Speaker. It is very doubtful whether Mr. Randall, Mr. McAdoo, or any of their friends, would be willing to resort to the extreme measure of voting against the behests of the party caucus on the Speakership, preferring to take a defensive or aggressive attitude further along in the contest, as circumstances might determine. The Randall men will never consent to Mills of Texas being made Chairman of the Committee on Ways and Means. Carlisle would probably Breckinridge, and would be very glad to get away from Mills on any plea which he could justify as not having been influenced or dictated by Randall.

Now that the elections are over and Carlisle is on the ground, the leaders on both sides will begin to gravitate toward the capital. In three weeks from to-day Congress will be in session. The President's message will have laid down the Administration's law and gospel on the finances, surplus and tariff, and the national Solons will be dumping their economic panaceas into the Legislative hopper by the team.

Judging from advices received here the varied interests affected by the tariff are waking up to the importance of being ready to meet the issue. There is no question that the conflict between protection and free trade will take a more persistent and aggressive form than at any time within the past 30 years. For the first time within over a quarter of a century the weight of the Administration will be thrown against protection for the sake of protection.

LATEST CUSTOMS DECISIONS.

Horse clipping machines, which are almost identical in construction, appearance, mode of operation and general design with hair-clipping machines, are held to be dutiable at the rate of 35 per cent ad valorem for "cutlery," under and in pursuance of Department's ruling of the 1st of April last, which, by the advice of the U. S. Attorney-General, acquiesced in the decision of the court at Chicago that hair-clippers were liable to duty under the provision for "cutlery."

So-called dog-leaders and cartridge-belts, manufactured in part of leather, steel, iron, and brass, the metal portions being important features thereof, are held to be dutiable at the rate of 45 per cent ad valorem, for "manufactures, articles, or wares not specially enumerated or provided for in this act, composed wholly or in part of * * * metal."

SUPREME COURT DECISION ON THE DRIVEN WELL PATENT.

What is known as the Driven Well patent, which has been several times before the United States Supreme Court and which has always heretofore been sustained, was declared invalid in an opinion by Justice Blatchford, based upon the record in case No. 16, Andrews, Green and others against George Hovey, brought here by an appeal from the United States Circuit Court for the Southern District of Iowa. This court holds that the fact now made to appear for the first time in the driven well litigation, that the invention was used in public at Cortland, N. Y., by others than Green more than two years before application for patent was made, is a fact which is fatal to the patent's

validity. The decree of the circuit court in favor of the alleged infringer, Hovey, is affirmed.

Coinage of the Fiscal Year 1886-87.

The material portions of the report of the Director of the Mint have been obtained in advance of its presentation to Congress, and contain a number of interesting facts. It is shown that the total coinage of the year is \$56,759,762, of which \$22,812,270 was gold, as compared with a total of \$64,099,727 for the previous year, of which \$34,077,380 was gold. The relative proportions of gold and silver coined in the two years have been completely reversed. The coinage of gold was smaller the past year than in any previous year since the California gold discoveries in 1849 gave an active impetus to mint operations. The year 1885, with a gold coinage of \$24,861,123, and 1884, with a coinage of \$27,932,824, were the smallest on record previously. Concerning silver the coinage has steadily increased, and last year was heavier than ever before. The net profit on the silver coinage in 1887 was \$7,890,000, and is a notable feature. The regular tabular exhibit of the coinage and bullion awaiting coinage at the mint at the close of the fiscal year is now presented in a more intelligible shape, metallic and representative money being separated, as follows:

	In other banks and general circulation.
Metallic—	
Gold coin	\$98,137,439
Silver dollars	6,443,213
Subsidiary silver	2,813,138
Total	\$107,393,700
Representative—	
Legal tender notes	\$74,477,344
Old demand notes	57,180
Certif. of deposit	7,810,000
Gold certificates	54,274,949
Silver certificates	3,555,479
National bank notes	22,961,737
Fract. paper cur'cy	564,366
Totals	\$163,624,764
	\$682,408,390

The statement is conclusive in showing that there is a greater amount of money, including coin and paper of all classes, in circulation to day than ever before. The relative showing for the past five years is as follows:

Active circulation July 1, 1883	\$1,231,125,497
Active circulation July 1, 1884	1,254,789,072
Active circulation July 1, 1885	1,299,015,396
Active circulation July 1, 1886	1,341,813,966
Active circulation July 1, 1887	1,326,748,747

These are the official figures, revised to correct errors in the reports of 1885 and 1886, which ignored the consumption of gold in the ores and were otherwise inaccurate. The current impression that contraction has been going on in the last few years is proven to be unfounded.</p

New Picks and Mattocks.

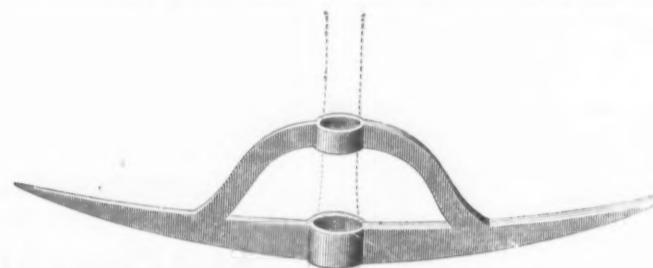
The Sanford Fork and Tool Company, Terre Haute, Ind., are about putting on the market a new line of picks and mattocks, the special features of which are illustrated in the accompanying cut. It will be seen that the object of this improvement is to provide two or more bearings for holding the handle in the tool, whereby its liability to break or work loose is lessened. In these goods the eye, corresponding to the eye of the regular line, and the portions of the arms connected therewith, are made narrower and thinner than they have been heretofore constructed, and about the quantity of metal dispensed with in forming the usual head and eye portion of the arms is extended from the arms to form a brace. These braces extend upward, as shown in the cut, and are united to form a second or

and operated, are shown in the illustration given, which represents the waiter adjusted in position, with ropes and counterpoise weight in place. The makers inform us that the car can be hung with only one wheel, E, as shown in the cut, or with two wheels for the purpose. Two wheels are furnished with each set of fixtures, and it is recommended that where the car of a waiter is over 20 inches wide, that two wheels be employed, thus distributing over the top of the car the fixtures through which the rope passes. A special feature of this device is that the fixtures for any size waiter are the same in size. The waiter is provided with a safety rope, thus insuring against accident or breakage in case the hoisting rope gives away from long use. This is a desirable feature, and is said to be peculiar to the device here illustrated. The makers claim for this waiter that it is so

space tub without any mountings, and indicates, in one particular at least, features of construction. The composition of the material of the tub is at present, we believe, a secret. A sample before us, broken away from a tub, shows that the wall is about 1 inch in thickness. It is hard, being prob-

adapted to right or left handed persons. Another feature of the knife is that the blade is made up of sections which are firmly riveted on a strong malleable iron back in such a way that in case of breakage or damage of any of the sections they can be removed and replaced by new ones at a slight

the special features of this brush, and allude to it as the only one on the market that has a rubber attachment. Samples will be sent on receipt of 50 cents. The company also



A New Pick Axe.

supplementary eye somewhat smaller in diameter than the eye in which the end of the handle is held. It will thus be seen that the tool here described is about the same weight as the regular article, having the increased strength which comes from the braces. The point is made, while the regular pick axes and such tools with only a single eye in the head, giving a bearing of only the thickness of the head, need to have the head thick and heavy, with a liability even then of the handle to work loose or become weakened by wearing near the point of the eye, that those herein described, without any increase of weight, have much more strength and durability. The company are preparing to put on the market a full line of goods embodying this principle, and are confident they will meet a want of the trade and be found an important improvement on the patterns heretofore used.

The New York Safety Dumb-Waiter Fixtures.

This article, which is manufactured by the Edward Storm Spring Company, Poughkeepsie, N. Y., for whom John H. Graham & Co., 113 Chambers street, New York, are agents, is put on the market with a special view to its sale by the hardware trade. Heretofore the number of sizes required, the high prices, and the complicated mechanism

simple as to be readily put up by any ordinary mechanic. It will also approach closer to the ceiling and come down nearer to the floor than many other waiters in general use. Each set of fixtures is provided with a clamp brake adapted to hold the car at any desired point when loaded beyond balance. The car moves with such ease that it is asserted that a child of ten years can operate it readily. It is noiseless, and it is free from parts liable to breakage. The ropes are always tight, the manner in which the counterpoise is attached allowing for both stretching and shrinkage. The manufacturers have issued a pamphlet showing, in addition to the illustration we present, horizontal cross sections and general view of the wheels in position, thus making the mechanic familiar with the way in which the work is to be put up.

The Acme Sash Fastener.

P. & F. Corbin, New Britain, Conn., have recently put on the market the Acme Sash Fastener, which is represented in the illustration given herewith. This fastener is operated by an eccentric, moved by the lever shown. This lever, when the fastener is open, is on the other side from that on which it is rep-

resented in the cut, which shows the fastener closed. The first quarter turn of the lever brings the engaging hook in connection with the portion of the fastener on the other sash and locks it, while the next quarter turn, to the position shown in the cut, draws the hook inward, and thus completes the operation, locking the sashes rigidly. Special emphasis is laid on the fact that this sash fastener is made of wrought metal, and is, consequently, not so easily broken as the regular line now in the market. It is made in a variety of finishes, to adapt it to the requirements of the trade, wrought iron with amber finish, also copper-plate, brass-plate and bronze-plate, and also in genuine brass and bronze metal.

Keystone Laundry Tubs.

We have had much pleasure in examining the new line of laundry tubs known as the Keystone, which are being introduced by Tanner, Keeney & Barkewell, Nos. 90 and 92 Pacific avenue, Jersey City, N. J. The first of the engravings submitted herewith

slipping off in the operation of driving. These nails are represented in the accompanying illustration. They are referred to as especially adapted for hardwood finish, and also for putting up gilt and other moldings in rooms, preventing as they do the marring of the wood, and enabling the workmen to set the nails rapidly. These nails are described as made in all sizes of the best steel wire, and at the same price as the common

The Meadville Wire Nail Company, Meadville, Pa., are putting on the market patent concave head finishing wire nails and brads which have a countersink in the head to hold the point of a set punch and prevent it from

finishing wire nails. They are referred to as giving satisfaction where introduced, and filling a long-felt want among carpenters, furniture makers, &c.

American Sickle Edge Hay Knife.

The Ney Mfg. Company, Canton, Ohio, are manufacturers of this hay knife, a rep-

resentation of which is given in the illustration herewith presented. It will be observed that this hay knife is made with a ratchet handle, so that it may be adjusted or set in any position to suit the operator, as well as

cost, and with little trouble. It will also be

seen that the knife is made in sections, and

an advantage claimed to result from this

feature is that the short blades can be tem-

pered evenly, so that the blades are one

temper throughout. The manufacturers lay

special emphasis on the cutting qualities of

the knife, claiming that it will cut with a

special rapidity and economy of labor. The

sickle part is on the flat side of the sections,

leaving the beveled side smooth to allow for

grinding or sharpening it if becomes dull or

slightly damaged. This sharpening may be

done on a grindstone, but the ordinary

whetstone or scythe stone is referred to as

done.

the

Special Notices.

BUSINESS OPPORTUNITIES.

FOR SALE.

The Boston Alarm Bell Knob.

Owing to the death of Mr. Francis W. Pearson, the above property is now offered for sale, with the patent stock on hand and in process of manufacture, machinery, such as lathes, planers, milling machines, press cutters, drilling machines, shafting, pulleys, bangers, bench tools, patterns and jigs, which were used in carrying on the manufacture. The goods are quick sale and pay from 100 to 200 per cent. profit. This is the only knot that rings only when you come in and not when you go out. The bell forms a portion of inside knot. They are in use in hotels, banks, office and private dwellings, and have the highest testimonials. To a party who wishes to increase their business, or one who wants a safe and profitable business with quick sales, this presents an unusual chance. Price, \$5000. The advertiser would furnish \$2000 of the above if allowed the sale for New England of the Alarm Bell Knob. For particulars address,

STILES FROST,

178 Devonshire St., Boston, Mass.

ATTENTION,

Capitalist - and - Foundryman.

An Incorporated Company offers for sale State Rights to manufacture, and sell a valuable Patent Boiler (for house-heating). Hundreds in successful operation, which can be referred to for full particulars.

Address Box 1006,

WORCESTER, MASS.

New England States reserved.

VALUABLE IRON MINE FOR SALE.

This property covers an area of 300 acres and exhibits at various points an Ore giving 60 per cent. of Iron-furnace best—no sulphur or phosphorus. The property is situated within 10 miles of Ottawa and is most favorably placed for mining operations. The highest reports upon the property have been received from first-class experts. Title perfect. The new Canadian Iron tariff makes this a most valuable property. Samples of the Ore and further particulars can be obtained by applying to the Manager, Ontario Bank Ottawa, Canada.

FOR RENT.

VALLEY FORGE MILL AND WATER-POWER.

(Belonging to Estate of Charles H. Rogers, dec'd.), Situated at Valley Forge, Pa., on the Phila. and Reading Railroad, 25 miles from Phila. The buildings consist of stone stonewall Mill, stone water-wheel, 25 stone Tenant Houses and stone Dry & Dyke House. The water-power is known as one of the best in the State. The property was occupied for many years at Woonsocket and Cotton Manufactury, but adapted to general manufacturing purposes.

For particulars, address

J. B. CARTER, Hardware Manfg. Agent,

504 Commerce St., Philadelphia.

NOTICE

TO HARDWARE MANUFACTURERS.

If you have any desirable specialties for which you would like to establish an agency in Philadelphia, please address

J. B. CARTER,

Hardware Manufacturers' Agent,

504 Commerce Street, Philadelphia, Pa.

For Sale or Lease.

A SPLENDID OPPORTUNITY FOR FOUNDRYMEN and MACHINISTS to do a large business in this business at an extensive and old established plant, the engine works, &c., formerly so well-known as the WOODCOCK & BEACH IRON WORKS, located at Hartford, Conn., and covering about five acres, are now offered for sale. The plant is well equipped with all of the valuable patterns belonging to these works, would be in itself a source of large yearly income. For full particulars and for circulars describing the property, apply to H. B. BEACH & SON, Agents, Hartford, Conn.

WANTED.—A WELL INFORMED MAN to take the place of a partner recently deceased, in a well-established Carriage Hardware Business located in one of the best cities of Southern New York.

Address HARDY & SLAYMAKER,

Elmira, N. Y.

FOR SALE to close a partnership interest.

A that valuable leasehold property in the city of Baltimore, Md., together with the extensive MACHINE SHOPS, AND FOUNDRY OF GEORGE PAGE & CO., located thereon, with the Machinery, Patterns, Tools and Materials now in use in the manufacture of Steam Engines, Boilers, Saw Mills and other machinery. If not sold before the 20th day of November, 1887, the property will be sold on that day at public sale at the Exchange Sales Room, 122 East Fayette Street, Baltimore, Md. For prices, terms and more full description, address

GEORGE PAGE & CO.,

14 North Schroeder Street, Baltimore, Md.

FOR SALE.—A good clean STOCK OF HARDWARE, Stoves, Iron, &c., in live N. J. town; or will exchange for Grocer's Business in a good-sized town; good reason for selling. Address

Box Z,

Office of The Iron Age, 66-68 Duane Street, N. Y.

FINE OPENING FOR A FOUNDRYMAN.

In consequence of the death of the manager a fine Foundry and Machine Shop, doing a large business at Birmingham, Ala., is on the market

Address BOX 603, Birmingham, Ala.

NOTICE.

A well established house in Philadelphia, now representing hardware manufacturers of prominent and note, in desire of making another connection with a first-class manufacturer of Shelf Hardware, Steel or articles of special nature. Best reference in all trades furnished. Address "CHAINS,"

Lock Box 106, Philadelphia.

TO HARDWARE MANUFACTURERS.

A Hardware Manufacturers' Agent, with thoroughly established business in Philadelphia and vicinity, desires to represent another manufacturer in connection with his present line.

Address S. B. RAESER,

51 North 5th St., Philadelphia.

FOR SALE, A CLEAN STOCK OF HARDWARE. Rare chance for a live man; reason for selling, old age. For full particulars, address

500 N. Ninth Street, Reading, Berks Co., Pa.

Special Notices.

Special Notices.

BUSINESS OPPORTUNITIES.

FOR SALE.

ROLLING MILL!

Will be sold publicly to the highest bidder, on the premises, the industrial plant known as

SWIFT'S IRON AND STEEL WORKS,

Situated in the City of Newport, Ky., opposite the City of Cincinnati, Ohio, on the east bank of the Licking River, within a thousand yards of the Ohio, comprising 8 acres of land, including the buildings, structures, machinery, fixtures, and appurtenances thereto belonging and in connection therewith.

The same will be made on the premises, beginning at 10 o'clock a. m.

On Saturday, December 17, 1887,

On a credit of \$6, 12, 18, 24, and 30 months' equal payments—no cash down.

The Master Commissioner of the Campbell Chancery Court will make the sale under a judgment of said Court, rendered in the action of Adam Wagner, Plaintiff, against Swift's Iron and Steel Works, and John Tracy, Defendants.

Address, 66 and 68 Duane Street, New York.

SKILLFUL MECHANICAL ENGINEER thoroughly understanding draughting, must have large number of men to control, and must be an adept machinist. Address C. E. BIGELOW, 93 Street, New York City, Care of Knowles Steam Pump Works.

ONE OF TWO SALES MEN acquainted with the MHL, Factory and Railroad Supplies, those with credit or by trade preferred. All communications will be confidential. Address, stating age, experience and salary expected, "R. R. Box 910, Office of The Iron Age, 66 and 68 Duane Street, New York.

TRAVELING SALESMAN—Must be familiar with the pump business and experienced in selling goods on the road. No applications will be considered unless accompanied by references. Address, stating age, experience, references and salary expected, THE COLUMBIANA PUMP & MACHINE CO., COLUMBIANA, Ohio.

MANAGER FOR LARGE BOLT WORKS;

one competent to make and sell the product, a pushing, practical, systematic man of integrity, judgment and discretion, and conversant with the manufacture of bolts, who learn of a fine position upon addressing "Bolts," Box 214, Office of The Iron Age, 66 and 68 Duane St., New York.

MAN COMPETENT TO MANAGE a NAIL FACTORY, making steel Nails. Address R. E. BLANKENSHIP, Richmond, Va.

TRAVELING SALESMEN WANTED.—COMPETENT, ENERGETIC AND PUSHING

SALESMEN to sell a line of special goods well known to the Hardware, Stove and House-Furnishing Trade; must be familiar with the Hard-ware Business, and experienced in selling goods on the road, and furnish first-class references. Other lines not conflicting can be taken. Liberal com- mission. Address "Box 143," Manchester, N. H.

TRAVELER TO SELL TABLE AND POCKET CUTLERY to the retail trade in the Eastern States on commission; also one each for New York State, Pennsylvania, Ohio, Indiana and Michigan; only those need answer who have an established trade and who wish to add above goods to their line. Address "CUTLERY," Box 279, Office of The Iron Age, 66 and 68 Duane St., New York.

Large Lathes in Stock.

SITUATIONS WANTED.

UNDISPLAYED ADVERTISEMENTS FOR SITUATIONS WANTED NOT EXCEEDING FIFTY WORDS FIFTY CENTS EACH INSERTION. ADDITIONAL WORDS ONE CENT EACH.

MAN OF ABILITY AND EXPERIENCE de-sires a position with a first class hardware or manufacturing company as TRAVELING SALES MAN; an established trade; best of references. Address "W. W.," Box 4, Office of The Iron Age, 66-68 Duane Street, New York.

MANUFACTURERS or others desiring to be represented in New York and neighboring cities can find a competent and experienced SALES MAN or representative by addressing as below. Twelve years' experience in general Hard-ware and Cutlery. Address "COMPETENCE AND EXPERIENCE," Office of The Iron Age, 66-68 Duane Street, New York.

YOUNG MAN of six years' experience in RETAIL HARDWARE and Stove Store—three years as Manager position as MANAGER or Order Clerk in retail store with chance of becoming partner in time. Best of references to ability and character furnished from present employer. Address "MANAGER," Office of The Iron Age, 66-68 Duane Street, New York.

EXPERIENCED TRAVELING HARDWARE SALES MAN would like position with some good manufacturing house. References given. Address "TREAU," Office of The Iron Age, 66-68 Duane Street, New York.

PRACTICAL MECHANIC, thoroughly posted in all branches of MANUFACTURING HARDWARE is open for an engagement as Superintendent. Address "HARDWARE SUP'T," Office of The Iron Age, 66-68 Duane Street, N. Y.

BESSEMER MAN of twenty years' ex-perience, the last ten as Superintendent, which position he would desire a similar position. Understands fully mining and manipulating all grades of steel from .08 to .50 car. Can handle men closely and effectively and accustomed to plan and direct construction. Address "BESSEMER STEEL," Office of The Iron Age, 66-68 Duane Street, New York.

MAN OF FIFTEEN YEARS' EXPERI-ENCE as Salesman and Buyer in Heavy and Shelf Hardware, a position as TRAVELING SALES MAN for coming year; a thoroughly posted man in all branches. Can furnish first-class references. Address, "A. C. E.," Office of The Iron Age, 66-68 Duane Street, New York.

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Special Notices.

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FOR SALE—MACHINERY.

No. 10 Billes Press, same as new.
No. 2 Garvin Mill, 10 ft. x 8 ft.
Garvin Milling Machine, same as new.
No. 5 Emery Grinder, same as new.
12-in. Double Table Shaping Machine, new.
12-in. Steepeo double geared Shaper, new.
15-in. Steepeo Shaper, new.
10-in. Shaper, Bixton & Plummer, new.
14-in. x 8 ft. N. H. Planer, second-hand.
Planer, 20 x 4, second-hand.
Planer, 24 x 4, second-hand.
Planer, 24 x 5, Pond, new.
Planer, 24 x 5, Pond, new.
No. 1 Garvin 2-Spindle Drill, good order.
15-in. B. G. S. F. Drill, new.
24-in. B. G. S. F. Upright Drill, new.
38-in. B. G. S. F. Upright Drill, new.
20-in. Upright Drill, B. G. S. F., new.
32-in. B. G. S. F. Drill, new.
36-in. B. G. S. F. Drill, new.
Engine Lathe, 32 x 16, good.
Engine Lathe, 28 x 16 ft., new.
Gage Turret Lathe complete with slide rest, same as new.
Gage and Lathe, excellent order.
Engine Lathe, 28 x 14, new.
Engine Lathe, 28 x 12, new.
1 Engine Lathe, 16 x 8 ft., compound rest, a-hand.
1 Loomard & Clark Lathe, 16 x 8.
1 Engine Lathe, 16 in. x 7 ft., second-hand.
Engine Lathe, 22 in. x 12 ft., new.
Engine Lathe, 16 in. x 8 ft., G. Screw Cutting.
Engine Lathe, 16 in. x 8 ft., power, cross-feed new.
Engine Lathe, 18 x 8 ft., power, cross-feed and compound rest, new.
Engine Lathe, 20-in. x 8 ft., power, cross-feed and compound rest, new.
11-in. x 6-ft. 8-in. Hand Lathe, with Chuck, s-h'd.
6-in. Double Cutting Off Machine, wood, J. Johnson & Co.
14-in. Wells Bolt Cutter.
Key-seating Machine, Howard.
Cold-Rolled Shafting, Hangers, Pulleys, &c.
AGENTS FOR
L. W. Pond Machine Co. Planers; Currier & Snyder Drills; Bickford Drill Co.; McMahon & Co. Lathe; Fay & Scott Kingin Lathe; John Steepeo & Co. Shapers
FRASER & ARCHER, 121 Chambers St. N. Y.

FOR SALE—Second-Hand Iron and Wood-Working Tools.

One Engine Lathe, 15 in. x 6 ft. Blaisdell.
One Engine Lathe, 16 x 6 ft. Putnam.
One Engine Lathe, 16 x 8 ft. New Haven.
One Engine Lathe, 30 in. x 10 ft. New Haven.
One Engine Lathe, 16 in. x 20 ft., left hand.
One Turning Lathe, 16 in. x 6 ft., triple geared.
One Horizontal Shaping Machine, 24 in. x 18 in. x 10 ft.
One Iron Planer, 30 in. x 28 in. x 7 ft.
One Iron Planer, 48 in. x 18 in. x 2 ft.
One No. 2 Bement Cutter and Keyseat Cutter.
One 15-in. x 12-in. Radial Mill.
Two 12-in. Planers.
One No. 1 Browne & Sharpe Universal Milling Machine, complete, new.
Two Double Bolt Cutting Machines.
One 12-in. x 12-in. Vertical Milling Machine.
One No. 2 Am. T. & M. Co. Brass Lathe, Slide Rest, Box Chuck and Turret that attaches to tail spindle.
One Boiler Planer to plane 13 ft. sheet.
One Left Hand Planer, 16 in. x 12 ft., working 15-in. hole in 14-in. iron, 6 in. from edge of sheet.
One 3000-lb. Bement Steam Hammer, double stand.
One 600-lb. Davy Steam Hammer, single stand.
One Bement Suspension Drill, single geared.
WOOD WORKING TOOLS.
One Lane & Bodley Car Mortising and Boring Machine.
One J. A. Fay & Co. 3-Spindle Vertical Car Boring Machine.
One J. A. Fay & Co. Universal Horizontal Car Boring Machine.
One J. A. Fay & Co. No. 4 Car Tenoning Machine, double head and double corner.
One Daniel's Planer, 24 in. x 24 in. x 36 feet, wood frame.
Two 12-in. x 12-in. Style Boring and Mortising Machines, Buck Pattern.
One F. Small Iron Frame Saw Table.
One 75 x 7 Westinghouse Automatic Engine, new.
Also a full line of New Wood and Iron Working Machines, including various sizes of Hoists, Sturtevant Blowers and Exhaust Fans, Lathe, Planer and Drill Chucks, all styles, Twist Drills, &c., &c.
U. BAIRD MACHINERY CO.,
75 Water St., Pittsburgh, Pa.

SECOND-HAND MACHINERY.

One 500 H.P. Corliss Engine.
One 200 " Plain Sliding Valve Engine.
One 150 " Naylor Engine.
One 65 " Wilbraham Engine.
One 40 " Beder Cut-off Engine, high speed.
Supplied Engine.
One 15 " New York Safety Vertical Engine.
One 5 " Wood, Taber & Morse Port, on wheel.
Eric City Iron Works Port, on skids.
Shapley Engine and Boiler.
One 50 " Marine Boiler.
One 25 " Locomotive Boiler.
One 50 " Hor. Tubular Boiler.
One 30 " Vertical Tubular Boiler.
One 25 " Hor. Tubular Boiler.
22-in. x 10 ft. Pond Engine Lathe.
One 20 in. x 10 ft. N. Y. Steam Engine Co.'s Lathe.
One 16 in. x 8 ft. Harrington Lathe.
One 20 in. x 8 ft. Ames Lathe.
One 15 in. x 6 ft. Harris Lathe.
One 2-Spindle Drill Press.
One Hand Mill.
One 12-in. Compound Planer.
One large Worthington Duplex Pump.
One Cope & Maxwell Deep Well Pump.
Please write and say what you want. I have a large stock, constantly changing.

HENRY I. SNELL,
135 North 3d Street, Philadelphia.

Rolling Mill Machinery.

Rolls and Housings for 9 in. and 16 in. trains.

Furnace Boilers.

Iron Work for Boiler Settings.

Furnace Castings.

Floor Plates, &c.

For sale by the pound at a low price by

DAN'L W. RICHARDS & CO.,
88 to 90 Mangin St., New York.

FOR SALE—25 Lathes, 14 in. to 24 in.

Planer, 43 in. x 26 in. x 8 ft. 4 tools.

43 in. x 26 in. x 8 ft. 4 tools.

43 in. x 26 in. x 30 ft. 4 tools.

All Pond's made, first class order.

Engine, 16 in. x 36 in., Corliss.

16 in. x 42 in., Corliss.

Send for catalogue. A. B. PITKIN,

4-12 Cove, 28-32 Eddy Sts., Providence, R. I.

FOR SALE.

ONE SCREW PLANER.—14-foot Bed; will take

in 4 feet between uprights.

Address

SHICKLE, HARRISON & HOWARD IRON CO.

St. Louis, Mo.

FOR SALE.

Large lot second-hand iron tanks, all sizes and shapes, from 5000 gals. down, about 50 new two barrel oil tanks with pumps, all complete. Second hand Boiler Shells for stacks and tanks; fly wheel 64 in. diameter, 14 in. in. face, 5 in. bore. Cast iron fly wheel, Second hand Engine, 16 in. x 12 ft. Wrought and Cast Scrap, Red and Yellow Brass, Copper, Lead and Zinc. HUSSENIUS & CUNLIFFE, Dealers in Scrap Iron and Old Metals, 12th and Washington Ave., Philadelphia.

Special Notices.

MACHINERY.

Second-hand Machinery in Good Order. For Sale Cheap.
1 Engine Lathe, Good order.
1 Engine Lathe, 26 in. x 24 ft. Triple Geared.
" " " 36 in. x 7 ft. 1 Engine Lathe 18 in. x 8 ft.
" " " each 24 in. x 20 in. and 24 ft.
" " " 24 in. x 12 ft. Bed. Fifield.
" " " 30 in. x 12 ft.
" " " 28 in. x 15 ft. 16 ft.
" " " 28 in. x 20 ft.
" " " 22 in. x 10 and 12 ft.
" " " 10 in. x 8 and 10 ft.
" " " 14 in. x 6 ft.
" " " 12 in. x 5 ft.
" " " 15 in. x 6 ft.
" " " 11 in. x 4 ft. and cft.
" " " 10 in. x 4 ft. Foot power.
1 Axle Lathe, Bennett & Son.

16 in. x 16 ft. 3 ft. Pratt & Whitney.

1 ea. " 24 in. x 24 ft. 8 ft.

1 Planer, 30 in. x 30 in. x 7 ft.

1 Shaper, 6-in. stroke, 12 in. Shaper, two tables.

10-in. stroke, Gould.

1 Drop Hammer, Bissell & Peck.

16-in. Vertical Hammer.

1 No. 52 Ferracuta Press, 1 Nut-Facing Machine.

12-in. Power Presses, assorted.

2 Return Tubular Bolters, 16 ft.

1 National Bolt Cutter, sizes 1/4 in. to 1 in.

1 Hole Cutter, Sizes 3 in. to 2 in. included. Wm. W. Smith & Son.

1 1/2-in. x 10 ft. 1/2-in. x 10 ft.

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THE WEEK.

The New York Emigration Commissioners are in an impecunious state bordering on bankruptcy, the Secretary of the Treasury having refused to pay the balance due in their accounts until certain disputed expenditures are satisfactorily explained. The Secretary will recommend that the entire management of immigration affairs at the different ports be placed in the hands of officers of the general Government.

Traders at St. John, N. B., are spurring the Government at Ottawa to a speedy decision of the winter-port question, as to whether Halifax or St. John shall be chosen as a terminus for the Canadian Pacific Rail-way.

The total tonnage carried on the Erie Canal this year up to the 8th inst. is 4,982,000, compared with 4,743,000 for the same time last year. This remarkable increase is considered to be in a great measure due to the policy of lengthening locks and deepening canals.

St. Louis had 25 alarms of fire in 15 hours, of which 80 per cent., according to a member of the Salvage Corps, were of incendiary origin. The loss of property amounted to \$250,000.

The report comes from Vera Cruz that English capital has been raised to build a railroad, which will start from the line of the Vera Cruz Railway and run through to the Pacific Coast, terminating at Acapulco, thus furnishing an interoceanic route fully under English control. It is understood that one or two other important Mexican railway schemes, to be undertaken by English capital, are likely to be soon commenced.

The shipyards in Buffalo have been closed for several days in consequence of a demand that they discharge all workmen who are not Knights of Labor and employ none other. In a circular the proprietors define their position, and add: "We insist on our right to employ any man we choose, independent of his membership or not in the Knights of Labor or any other union or association, and we will not discharge a single man at the dictation of any such organization when there is nothing against him further than that he does not belong to it. In this position we are firm, and we will keep these yards closed forever rather than submit to such unreasonable demands."

President Cleveland issued a proclamation announcing the extension for seven years of the commercial reciprocity treaty with Hawaii. This extension of the Hawaiian treaty has been pending since 1884. Last winter the Senate amended it by adding a provision ceding to the United States the use of Pearl River harbor as a coaling station. This amendment is accepted by Hawaii and ratifications have been exchanged.

O'Brien and Weaver, who were accused by the London police of being in collusion with dynamiters, prove to be the inventors and patentees of a lightning arrester for oil tanks, and are practical engineers employed in Philadelphia. They do not believe in dynamite as a remedy for the troubles of workingmen.

Edward M. Jewell, of the well-known flouring firm in Brooklyn, died on the 10th inst., of cancer of the tongue, aged 41 years.

Vice-Chancellor Van Fleet, of New Jersey, granted an injunction to the executors of Wm. E. Dodge, restraining the Pennsylvania Railroad Company from elevating their tracks in Green street, Jersey City, to the detriment of adjacent property. As the change is in pursuance of a resolution of the Board of Works, a lively legal contest is expected.

The Cape Cod ship canal is now opened more than 1 mile from Barnstable Bay, 200 feet wide and from 12 to 20 feet deep.

The silk manufacturers at Paterson, N. J., last month made ribbons at the rate of 23,000 miles a year, or enough to extend seven times across the Atlantic Ocean. Paterson manufactures three-quarters of all the ribbon made in this country. About one tenth as much more is imported. The output of broad silk in yards is about one-tenth that of the ribbons in this country, and the product in silk handkerchiefs about one-tenth more. The value runs up into the millions annually. Directly or indirectly the silk manufacture in America gives employment to about 65,000 people.

The confederated trades unions, of this city, paraded 2000 men in Broadway in sympathy with the condemned Anarchists. In like manner the sympathizers with anarchy betrayed their numerical weakness by throwing only 6258 votes for Captain Black, attorney for the condemned men, while Judge Gary, who conducted the trial, was triumphantly re-elected.

A great steel bridge across the North River, from West Fourteenth street, on the New York side, to the opposite shore in New Jersey, is being talked about as feasible. It might not cost as much as the Brooklyn bridge or be so long in building.

J. H. Roach's shipyard, at Chester, will employ 800 to 900 men the coming winter.

Who shall control the New York State canals seems to have been decided by the recent election, for while pronouncing judgment against the platform that favored the

policy of Federal control, the people accepted by a large majority the platform which declares that "the State of New York needs and will accept no Federal aid for the improvement or maintenance of its canal system."

Postmaster Pearson, of this city, has issued a circular giving information concerning the writing and printing which the new regulations of the Post-Office Department permit or forbid on or in packages of mailable matter of the second, third and fourth classes without subjecting them to letter postage. Postmaster Pearson says that the circular conveys information "of great public interest to all who make use of the mails for the conveyance of printed matter and merchandise, involving, as it does, material changes in postal regulations applying to such matter."

The evil of lard adulteration for the foreign market has become so general that Western manufacturers are seriously considering the expediency of asking Congressional interference for these productions.

It is estimated, says the Chicago *Tribune*, that the imports of lard and its adulterations at Liverpool within the last 12 months have exceeded 240,000 tierces. How much of this is the genuine article it is impossible to say and difficult to guess. In general it may be assumed that most of that sent direct by the packers of this country was nearly pure, while that sent by refiners was open to suspicion.

Adulteration is practiced to such an extent that not only is the refined product much depressed in price, but the genuine has suffered to such a degree that the shipment of the latter is badly discouraged.

A conference of leading men representing five of the most important provinces in the Dominion was held in Quebec last week and resolutions favoring unrestricted reciprocity of trade between Canada and the United States were unanimously adopted.

The Shipping League Convention held its sessions in Birmingham, Ala., last week, and adopted resolutions endorsing the Negley bill, which provides for the creation of a naval reservation by the payment of bounties to American ships. The report was unanimously adopted, and the passage of the Negley bill will be urged upon the next Congress by the League.

The United States Commissioner of Internal Revenue in his annual report shows that the total receipts from all sources during the fiscal year were \$118,829,523, as compared with \$116,902,859 in 1886. It is estimated that the sum of \$120,000,000 will be collected from the various sources of internal revenue during the current fiscal year, provided no changes are made in the rates of taxation now imposed by the internal revenue laws. The Commissioner points out inconsistencies existing in the laws governing taxation and the collection of revenues, the comparative ease with which the Government may be defrauded, &c., and makes numerous suggestions to Congress for remedial legislation.

The act regulating the sale of oleomargarine was in force during the last eight months of the year, and the receipts under it aggregated \$723,948. In this connection the Commissioner says: "The addition of nearly a million dollars to the receipts of the United States through the operation of an internal revenue law taxing an imitation is unprecedented."

Sidney F. Shelbourne, a prominent electrician and a member of the American Society of Electrical Engineers, was instantly killed by the fly-wheel of an engine at the American Institute Fair. The machinery was in motion, and the Trenton engine fly-wheel, which sinks about two feet below the floor, was making about 200 revolutions a minute, when Mr. Shelbourne, who was a very large man, essayed to pass in the space between it and a staircase adjoining. His foot slipped, and before the engineer could seize him, Shelbourne disappeared within the compass of the wheel and was almost as quickly thrown out again terribly mangled. He was a graduate of the Stevens Institute, and has been engaged in various engineering enterprises.

A postal treaty between the United States and Barbadoes, just signed at Washington, is expected to stimulate trade with those islands. Barbadoes is on the direct route for steamships plying between ports in the United States and Brazil. At present it requires about 50 days to send an order to England and receive a reply. Under the new postal treaty this time will be reduced to 25 days, and, as many of the articles needed in the island can be purchased as cheap or cheaper in this country than in England, it is natural that the United States should be the gainer. The limit of size in the Barbadoes treaty is for packages 3 feet 6 inches long, or a combined length and girth of 6 feet. There are similar postal treaties pending between this country and Brazil, San Domingo, Hayti, Bermuda, Nassau, British Honduras and all the Central American republics, and it is believed that they may prove to be productive of large increase in our trade with those countries, and serve to open up many markets now practically denied to the United States.

The charge that labor in Louisiana is underpaid and therefore discontented is repelled by the New Orleans *Times-Democrat*, which quotes Judge Kelley as representing that while there is no doubt of the fact that the wages paid are smaller in the South than in

the North and West, the difference is more than offset by the smaller cost of living, and generally by the fact that the labor is not as skilled, particularly the factory labor, as in New England. In support of this view the editor says a great many hands have come from the West to work in the factories, the mines and the sugar district of Louisiana, where white labor is far more abundant than it ever was before. The number thus seeking employment has increased each year.

It is now understood at Washington that Postmaster-General Vilas will succeed Mr. Lamar as Secretary of the Interior, the latter, with the consent of Congress, to fill the existing vacancy on the Supreme Bench.

An oil refining firm in Harrisburg, Pa., claim that they have suffered severely from discrimination in freight charges by the Pennsylvania Railroad, and sue for \$100,000 damages. This is a test case under the new law.

The Southern Pacific Company expects to do an enormous business this winter between San Francisco and Portland, Oregon. Tonnage between those points was never before so heavy as at present.

Two attempts were made last week by incendiaries to destroy the ore dock apparatus of the Nyanco Iron Company, at Cleveland, Ohio. The engine house was also fired.

The total foreign arrivals at the port of New York in October was 439, including all classes, of which 116 were American. Among the British arrivals were 100 steamers.

It is shown by the investigations of the Assembly Committee in this city that telephone rates are extremely profitable.

The new scheme for making uniform and inflexible through rates in the various Atlantic seaboard cities to European ports went into effect on Monday, the 14th inst.

The General Freight Agents' Committee have arranged the following basis of rates to be quoted from Chicago to foreign ports, which, however, is subject to the ratification of the joint committees of the Central Traffic Association and the trunk lines. These rates are based upon an average of the prevailing rail and ocean rates, and it is understood that the Grand Trunk may charge three cents per 100 pounds less on through traffic via Montreal and Portland:

Rates in cents per 100 pounds from Chicago when in full carloads or more, to	Articles.				
	Bacon boxes, lard and beef in barrels, and tcs.	Lard and tallows in half-barrels, bls, and tcs., unen ed. me. us.	Lard in rocks and cases.	Flour, oats and c. meal in sacks.	Corn and wheat in bulk.
Liverpool	44	43	49	35	24
London	47	45	52	37	27
Glasgow	47	45	52	37	29
Bristol	47	45	52	37	27
Dundee	49	54	59	40	27
Amsterdam	50	50	55	40	27
Hamburg	48 ¹ / ₂	48 ¹ / ₂	53 ¹ / ₂	41	27
Bremen	51	51	56	42	27
Antwerp	47	47	52	39	27

The Fiftieth Congress will be asked to make laws requiring that all goods produced wholly or in part by convict labor be plainly marked "convict made," and where made, with a penalty and forfeiture of the articles if not so marked, and a like penalty and forfeiture if the articles are sold or offered for sale outside the State where manufactured.

Shall iron or wooden poles be used by the electric lighting companies in New York City is under discussion, with a tendency in favor of iron.

Seven men who were working in the caisson of the big Illinois Central bridge, near Cairo, 75 feet below the surface of the water and in an air pressure of 37 pounds, were, on Friday, stricken with the "bends," a kind of paralysis. The cause ascribed is that the men go through the air-locks too rapidly. The caisson company have hot baths and hot coffee ready for emergencies of this character, but the men do not take advantage of such facilities until too late.

The city of Cambridge has received a magnificent gift from Frederick H. Ringe, of that city, in the shape of a new City Hall and an Industrial School for boys. The latter must be inscribed as follows over the main entrance: "Work is one of our greatest blessings. Every one should have honest occupation."

The Treasury Department has published the report of the conference held by the appraisers of the ports of New York, Philadelphia, Baltimore, Chicago, Boston, Detroit and San Francisco, at the office of the former, from October 10 to 25. In publishing the report for the information of customs officers, Acting-Secretary Thompson states that: "Any suggestions and recommendations which conflict with existing rulings of the Department will not be considered as operative, but the decisions will continue to be followed until specifically rescinded or modified. In all cases where collectors are in doubt as to the application of the classifications recommended by the board, they will exercise their own judgment, leaving importers to their remedy by protest and appeal." Appraiser Baker, recorder of the conference, in submitting the report says that the tariff schedules were reviewed and disputed questions prosecuted and discussed with a view to bringing about a uniformity of valuation and classification

throughout the land. The report then proceeds to give the conclusions reached in a great variety of questions.

Austin Corbin grants a right of way, free of cost, for the extension of the Brooklyn water-works to South Oyster Bay.

The Elmira prison has been provided with a powerful electric light plant, driven by a 200 horse-power engine, illuminating 1000 cells and all the shops.

The amount of iron and steel shipbuilding in progress in Delaware, Pennsylvania and on the lakes is very large, indicating a substantial revival. The steamship to be built by the Delaware River Iron Shipbuilding Company, at Chester, will be 320 feet long and 42 feet beam, operated by triple-expansion engines of the latest improved design. She will ply between New York and Savannah. The keel for the mammoth side-wheel steamer Puritan, for the Fall River Line, has been laid and the plating is well under way. In Neafie & Levy's yard, Philadelphia, preparations are being made for laying the keel of the steamship for the Oregon Improvement Company. The Pusey & Jones Company, of Wilmington, Del., will launch a 1000-ton iron screw steamer for the Old Dominion Line this month.

J. Bigler, the iron shipbuilder, of Newburg, N. Y., is reported to have signed a contract to build an ocean steamer of large dimensions. The Perth Amboy Towing Line have contracted with T. S. Marvel & Co., of Newburg, for one of the largest iron tugs ever built in this country, 127 feet in length.

She will be supplied with large wrecking pumps, fire pumps, &c. Her engines are of the compound type, cylinders 24 x 42 x 30 inch stroke. The Bath, Me., Board of Trade

are considering the importance and advantage to the place of building a plant for the purpose of constructing iron vessels, gun-boats, &c.

Bank directors in some instances are simply ornamental. The Fifth National, of St. Louis, was managed by the president and cashier. The Fidelity National Bank, of Cincinnati, was run by the vice-president, and the Marine Bank, of New York, was known as Mr. Fish's bank until it took in too much water. All alike were ruined.

The estimates of the Chief of Ordnance Bureau for the next fiscal year call for about \$3,000,000, of which \$2,000,000 is for the armament of vessels authorized.

The manufacture of cast-iron projectiles for the new guns still goes on at the Washington yard, but efforts to secure cast-steel projectiles of the proper quality have met with little or no success.

The report says it is apparent that a reduction in the caliber of small arms is impending.

The Charleston, Baltimore, Miantonomah, the

four gunboats, the dynamite cruiser, the

torpedo-boat, the Newark and cruisers Nos.

4 and 5 are so far advanced that by the

fiscal year ending June 30, 1889, three-fourths of the appropriation for their armament will be required.

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The origin of fires in cotton bales is a subject upon which opinions vary, but there is much testimony supporting the view that they are frequently caused by sparks from the iron hoop, when bales are handled carelessly.

MECHANICAL.

Determination of Mechanical Equivalent of Heat on a Large Scale.

We take pleasure in printing this week engravings of the apparatus used by Messrs. E. A. Cowper and W. Anderson in their determinations, on a large scale, of the mechanical equivalent of heat, and described by them in a recent paper before the British Association. Previous reference to their methods and apparatus was made by us in our issue of September 22, 1887.

The suggestion, it will be remembered, was made that it would be possible to em-

ploy a powerful machine that would absorb a large amount of power, and to keep it continually going for a whole day at a time, so as to get everything into a thoroughly normal state, and so arrange matters as to eliminate all loss or gain from radiation or conduction. Accordingly, a Froude dynamometer was obtained and was fitted up with small tanks inside a larger one, which last was made of thick wood, and well lagged outside with three thicknesses of hair felt, and this provision was found in practice to be so efficient that the tank of water only lost 2° in $16\frac{1}{2}$ hours when standing, or about 1° in $8\frac{1}{4}$ hours. We will repeat here that two very large thermometers about 1 yard long were specially made, having 25 inches to 50° or $\frac{1}{2}$ inch to 1° , and these were used throughout for taking the temperature of the cold inflowing water and the hot outflowing water, while other thermometers were used throughout the outside tank to enable it to be kept to the same temperature as the outflowing water. The temperature of the outflowing water was, of course, taken immediately as it flowed out from the Froude's dynamometer, not at the waste. The waste water was carefully taken at short intervals and weighed, not measured. Several careful observers took observations continually, one took the revolutions of the engine per minute, and the total revolutions by a counter that was always going, and registered every revolution throughout the day. Another observer took the weight lifted by the dynamometer, another the temperature of the inflowing water, another that of the outflowing water, and another the general temperature of the tank, while one in command watched the whole, and saw that every one kept his register closely.

It is to be understood that the object aimed at was to employ continuously a large amount of power—viz., about 5 horse-power—and heat a very considerable quantity of water per minute—viz., about a gallon a minute—to a considerable extent—viz., about 20° F.—while all effects of radiation and conduction were neutralized as far as possible. The Froude dynamometer is shown in elevation and end view. In the engraving, B is a tank, surrounding the dynamometer; C is an outer tank, surrounding the inner tank; this is well clothed outside with three thicknesses of hair felt; D is a small steam pipe to keep the outer tank up to the temperature of the inner tank and dynamometer. The water to be heated is passed into the dynamometer through an india rubber inlet pipe, which is itself jacketed with water of the same temperature as the inflowing water. The pipe O is the outlet pipe, where the hot water flows out from the dynamometer. The power for driving the dynamometer is communicated through the shaft S, and a piece of wood is introduced between the flanges of the coupling in order to prevent the communication of heat either way, though the temperature of this shaft is kept up by the water in the outer tank. Thermometers were placed throughout the apparatus to enable it to be kept at an even temperature.

It will at once be seen how completely loss or gain of heat was prevented, as the temperature of the inner tank was the same as the outflowing hot water from the outlet pipe O, and the hot water from it flowed into the outer tank, which had a very small quantity of steam, to keep it to the temperature of the hot water from the outlet

pipe O. Thus the outer tank was, so to speak, down "stream," and, even if its temperature varied a little, it is impossible to conceive that it could practically affect the temperature of the hot water coming out of the dynamometer, especially as the quantity passing continually was very great, and had thus full command over the temperature of the inner tank. This it was that enabled the apparatus to be kept in a normal state for many hours together, and from which results might be obtained for any given length of time. The only thing that interfered at all with the perfect regularity of the experiment, as checked every five minutes, was a very slight variation in the speed of the engine, and an increase of

and until more experience is gained, it is only too likely that much risk may be incurred. It appears that engineers and ship-owners would not be over cautious if they fitted their boilers with self-closing stop-valves, which would operate automatically like safety water-gauge fittings. The stop valves on the boilers, too, might, in large ships, at all events, be fitted with appliances by which they could be closed from the deck, or, at least, some place which would be accessible, even if a steam-pipe burst.

The Hall Emery-Surfacing Machine.

We show on this page an engraving of an emery surfacing machine, built by the Hall Mfg. Company, Twelfth and Buttonwood

The work is carried under the wheel the same as in a planer or miller and is regulated in its upward and downward movement by a threaded sleeve with a dial and indicator, which provides for the raising and lowering of the table by the $\frac{1}{16}$ of an inch. The table is also arranged to incline at an angle in order to grind a bevel surface, the degree of inclination being regulated by a dial. The machine is in many respects unique, being really a compound tool, qualified with its various attachments to cover the range of all the work required of an emery grinder. The use of the emery wheel is rapidly increasing among skilled mechanics, and is usurping many of the operations heretofore performed by other tools.

the centers and facing the operator. The lateral angles are determined by a vernier at the base D, both graduated to degrees. The perpendicular movement of the work along the course of the wheel is effected by the lever F, and the movement across the face of the wheel by the screw C. By removing the cylinder cutter, the twist-drill grinder attachment can be quickly put in place. This device (not shown in the cuts) is for grinding flat or twist drills, and is adjusted to give more or less angle to the cutting lips and also to increase or decrease the clearance in all drills from $\frac{1}{4}$ inch to 2 inches in diameter. Other attachments are being added for saw gumming, &c.

Sanding Locomotives.

During the last 12 months successful experiments have been made on several English railways, with a view of proving that a small quantity of sand, properly applied, goes further to producing a favorable result than large quantities distributed at the wrong place. The means referred to are those by which a small jet of sand is thrown directly under the tread of the wheel by the aid of compressed air or steam. According to the *Engineer*, Mr. Holt, who has invented this sanding arrangement, claims the advantage before mentioned, and so far the experiments have shown that he is right, for, in the case of a four-wheeled coupled engine, it was found that the same amount of work could be exerted when the coupling-rods had been removed—i.e., heavy trains could be started and hauled with equal facility. This somewhat new application of sand has its merits, but the question arises, Is this small supply of sand alone to be advised? If the question was only one of adhesion we might say, from the experience gained on several railways, it was. But another very important factor must be taken into consideration, and that is the retardation to be brought about in the case of immediate danger, where the rails are slippery. Such a small jet of sand as applied by the apparatus in question would not prove very efficient in stopping a train under such circumstances. Still Mr. Holt's method of sanding is a step in the right direction, for if he can obtain enough adhesion to start and pull a train with a single engine by use of the jet of steam and sand, he does away with the coupling rods in a much more economical manner than by using separate cylinders as in the case of Mr. Webb's compound engines. Another mode of obtaining increased adhesion has been adopted for some years on the Swiss Central Railway in a tunnel about 4 miles long and on a rising gradient of $1\frac{1}{2}$. The way it is done is by injecting hot water in the same way as steam and sand are used by Mr. Holt. Hot water has been found to act better than steam. By using this arrangement a great advantage is gained not only by the saving of rails and tires from the destructive influence of the sand, but also the train runs much more freely. As a factor of safety this also plays no small part, as the sand boxes are kept in reserve and can be used for an emergency quick stop, where the sand is required to go under the whole train. With a small jet of sand cannot influence much more than the driving wheels of the engine. On the score of economy the hot water takes the preference, as shown by recent trials on the Belgian State railways.

A New 18-Inch Lathe.

Messrs. Sebastian, May & Co., of Cincinnati, Ohio, are putting on the market a lathe built from entirely new designs and patterns, with a combination of all modern improvements. It is made to standard gauges and special jigs, so that any part may be duplicated, and it is so arranged that the heaviest work may be done accurately and rapidly. The boxes are of hard bronze, spindle and all screws are of the best steel, the bearings being ground perfectly true. A $\frac{3}{4}$ -inch hole runs through the spindle. The front bearing is $2\frac{1}{2}$ inches in diameter, and $4\frac{1}{2}$ inches long. A four-speed cone for a $2\frac{1}{2}$ -inch belt is provided, the diameter of the largest step being $12\frac{1}{2}$ inches. Special care is taken to have the bearings of the spindle perfectly cylindrical, which insures the work turned being round.

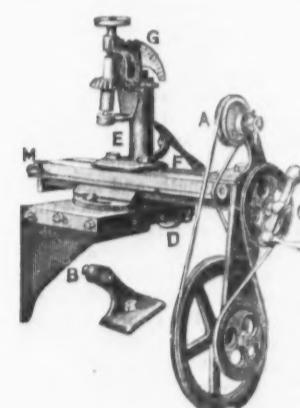


Fig. 2.—Universal Cutter and Cylinder Grinder with Vertical Head



EMERY SURFACING MACHINE AND ATTACHMENTS, BUILT BY THE HALL MFG. CO., PHILADELPHIA, PA.

which can be readily attached if required. The mandrel is of steel 2 inches in diameter, 40 inches long, overhanging the surface 12 inches to the wheel, with a front bearing of $5\frac{1}{2}$ inches; distance between wheels, $3\frac{1}{2}$ inches; diameter between flanges, $1\frac{1}{4}$ inches; diameter of flanges, 4 inches. It runs in composition boxes, provided with means for taking up wear in either direction, and is securely protected from emery dust by caps inclosing the entire bearing. The dimensions of the machine are as follows:

Base.....	18 x 32 inches
Height from floor to center of mandrel.....	49 inches
Width of head supporting column.....	12 inches
Width of head.....	7 inches
Extreme length of head.....	30 inches
Cone pulley.....	$4\frac{1}{2} \times 2\frac{1}{2}$ inches
Beveling adjustment of slide.....	40°
Diameter of mandrel between flanges.....	$1\frac{1}{4}$ inches
Weight, with countershaft.....	1150 pounds

graduated vernier upon the bed at M. Both sides of the mandrel or work are held by dead centers of hardened cast steel. The bed is adjusted to an angle so as to grind across the corner of the wheel. The vertical cutter-head G E is an attachment which can be used in connection with the Universal cutter and cylinder grinder, or independently upon its own bed. The engraving shows it adjusted by means of the I-slot upon the bed of the former. This device is a holder and guide for grinding all sizes and shapes of straight, spiral or angular cutters, and mills with straight or irregular faces and angles to 5 inches in diameter, or for backing off, and is adjustable by a graduated disk to 90° either way from the vertical. It takes in arbors or cutters 5 inches long. The perpendicular adjustment of the angles is read upon a dial opposite

All gearing is cut with improved cutters, making the running almost noiseless. The feed is applied by a simple and positive friction from a splined screw, so arranged as not to use the thread. Its accuracy is not, therefore, impaired for screw cutting. The screw is set up close under the top flange of the bed, bringing it very close to the line of strain and preventing the worming of the carriage so often noticed. The rest is a plain solid block, with circular collar and tongue for elevating the tool. A separate gear is furnished for every standard tap thread from 4 to 18, including one for $11\frac{1}{2}$, for pipe threads. The tail stock wrench also fits the change gear nuts, and the tool post wrench also fits the screws on the steady rest. Every lathe is belted and tested before leaving the shop, and is fully guaranteed.

Trade Report.

qualities being most in demand, and readily saleable at full quoted rates.

Foreign Iron.—There is no business doing, and, under present conditions, not much prospect of it. Asking prices are \$19.75 @ \$20, c.i.f., duty paid, for Bessemer, and \$26.50 @ \$27 for 20% Spiegeleisen.

Blooms.—There is some inquiry for Foreign Billets, but buyers' ideas are from \$1 to \$2 1/2 ton below the asking rates, so that there is not much chance of business being done. Asking prices are about as follows, say \$30.50 @ \$31 for Nail Slabs; \$31.50 @ \$32.50 for 4 x 4 Billets, \$35 @ \$36 for Siemens-Martin. Domestic Blooms as follows: Steel, from \$31 to \$35, f.o.b. cars at mill, according to analysis; Charcoal Blooms, \$53 @ \$54; Runout Anthracite, \$45 @ \$46; Scrap Blooms, \$38 @ \$39 1/2 " bloom" ton.

Muck Bars.—There is less pressure to sell, and prices are steady as quoted a week ago—viz.: \$30.50 @ \$31 at mill, according to location, &c.

Bar Iron.—The demand is still large, and mills that were running short of work, have been enabled to fill up again without making any appreciable concessions in price. There is a little more pressure to sell from interior points, but the demand seems to be large enough to absorb all the good Iron that is offered at about 2¢. Some of the country mills have shaded that figure; but, taking the market as a whole, 2¢ seems to be a very firm quotation on large lots, and that up on smaller quantities. Consumers of Bar Iron are all busy, so that a continuance of the demand seems to be pretty well assured. Skelp Iron is also in moderately good demand, and at about 2¢ would be freely taken, but sellers ask 2.05¢ @ 2.10¢, without securing much business at over 2¢. The week's business has been fairly satisfactory on the whole, and shows that there is a large consumption going on.

Plate and Tank Iron.—There is no special change of feature in this department. Orders are not numerous, but there is a good deal of work on hand, so that nearly all the leading mills are running to their fullest capacity. Inquiries are rather more numerous, and prospects are somewhat favorable for a renewal of the demand on a large scale, although there may not be much done until toward early spring. Prices are steady at about the following quotations, say Ordinary Plate, 2.30¢ @ 2.40¢; Tank, 2.40¢ @ 2.50¢; Shell, 2.6¢ @ 2.7¢; Flange, 3.5¢; Fire Box, 4¢; Steel Plates, Tank, 2.8¢; Shell, 3¢; Flange, 3 1/2¢; Fire-Box, 3 1/2¢ @ 4 1/2¢.

Structural Iron.—There is more inquiry for material for spring delivery, and in this respect the outlook is decidedly favorable. Mills have all the work they can handle during the balance of the year, with a very fair chance that the activity will be extended beyond that. A fair amount of orders have been entered during the last few days at about the following, which are now firm quotations: 2.4¢ @ 2.5¢ for Bridge Plate; 2.3¢ @ 2.35¢ for Angles; 2.8¢ @ 2.9¢ for Tees and 3.3¢ for Beams and Channels.

Sheet Iron.—The demand keeps up very fairly, and stocks in manufacturers' hands are kept at a very low point. Consumption appears to be very large, and prices are well maintained at about the following rates for small lots:

Best Refined, Nos. 26, 27 and 28..... 31¢
Best Refined, Nos. 18 to 25..... 32¢
Common, 34¢ less than the above.
Best Bloom Sheets, Nos. 26 to 29..... 4¢ @ 4 1/2¢
Best Bloom Sheets, Nos. 22 to 25..... 4¢ @ 4 1/2¢
Best Bloom Sheets, Nos. 16 to 21..... 3 1/2¢ @ 3 1/2¢
Blue Annealed..... 2 1/2¢ @ 3 1/2¢
Best Bloom, Galvanized, discount..... 60¢
Common, discount..... 60¢

Old Rails.—There is very little disposition to bid for Old Rails, except for such small lots as are immediately required. The offerings are correspondingly small, but the market will take only limited quantities at from \$22 to \$22.50, and any pressure to sell more than is asked for would be likely to break prices at once. The market is dull and hesitating, waiting for developments in other directions.

Scrap Iron.—There is rather more disposition to stock up, and large consumers are making bids of \$21, Philadelphia, for good No. 1 Scrap. Prices depend a good deal on quality, point of delivery, &c., but in a general way quotations are about as follows: Cargo lots, No. 1 Scrap, \$20 @ \$21; carload lots, \$21 @ \$22, or for choice lots \$22.50 @ \$23. No. 2 do., \$15 @ \$16 Turnings, \$15 @ \$16; Old Car-Wheel, \$17.50 @ \$18.50; Old Steel Rails, \$20 @ \$21; Cast Scrap, \$16 @ \$17; do. Borings, \$11 @ \$12; Old Fish Plates, \$27 @ \$28.

Wrought-Iron Pipe.—There is no change to report in this department. Mills are well supplied with orders, which bid fair to keep them employed the balance of the year. Discounts are as last quoted, viz.: Lap-Welded Black, 55%; Lap Welded Galvanized, 45%; Butt Welded Black, 45%; Butt Welded Galvanized, 35%; Boiler Tubes, 50 @ 52 1/2%.

Nails.—There is a fair amount of business being transacted, and, as but few of the mills are working up to their capacity, stocks are generally light. Prices, however,

are weak and unsatisfactory at from \$6 to \$10 from store, while carload lots are obtainable at less figures. At the meeting held in New York last Thursday nothing but routine business was transacted.

Chicago.

Office of *The Iron Age*, 95 and 97 Washington St., CHICAGO, November 14, 1887.

Pig Iron.—An increased business is reported, consumers manifesting a disposition to buy ahead, and a very slight concession proving sufficient in most cases to tempt them. Some large orders for Lake Superior Charcoal Pig Iron have been placed for next year's delivery by Car-Wheel manufacturers, as also by Agricultural Implement makers, who have deferred making their purchases until now, expecting that prices would be lower by this time. The general foundry trade also is buying more liberally, probably weary of waiting for the decline in prices predicted in so many quarters. In the very active condition of their trade, hand-to-mouth purchases have been prolific of annoyances to many foundries, and the change to liberal buying is made to secure a more regular supply. Concessions have not been general, and the furnace companies making them are now refusing to extend the same treatment to other customers, claiming that the condition of trade does not require it. Bessemer Pig Iron is neglected, a small sale of Lake Superior Charcoal Iron for Bessemer purposes being the only transaction in this line reported for some time. Makers of Coke Bessemer are actively searching for buyers. The supply of Southern Iron is again becoming more plentiful, several furnace companies having notified their agents here that they are prepared to receive orders for deliveries running into next year. Quotations have been very slightly changed, and are now as follows, on a cash basis, f.o.b. Chicago: Lake Superior Charcoal, Nos. 1, 2 and 3, \$22 @ \$22.50; Alabama Car-Wheel, \$27; Tennessee Car-Wheel, \$24.50; Southern Charcoal Foundry, \$2.50 @ \$23.50; Jackson County Softeners, No. 1, \$21.50 @ \$22; American Scotch, No. 1, \$22.25 @ \$22.75; Lake Superior Coke, all Ore, No. 1, \$22 @ \$22.75; No. 2, \$21 @ \$21.75; Lake Superior Coke, Cinder Mixed No. 1, \$21 @ \$21.50; No. 2, \$20 @ \$20.50; Heching Valley Coke, No. 1, \$20.50 @ \$21; No. 2, \$19.50 @ \$20; Coke Bessemer, run of furnace, \$22 @ \$22.50; Southern Coke, No. 2, \$20.75 @ \$21.

Bar Iron.—Conditions have changed very slightly since our last report, but fewer mills now seem to be willing to take orders at the extremely low prices which have recently prevailed. A fair run of orders has been placed during the week and considerable business is still in sight. Common Iron not guaranteed is quoted on a basis of 1.85¢ in carload lots, f.o.b. Chicago, while Good Muck Bar Iron is usually sold at 2¢, same delivery, with concessions of half extras. The demand on the store is excellent, prices ranging from 2 1/2¢ to 2.25¢, according to quantity and specification.

Structural Iron.—No new developments have occurred in this branch of trade, prices and demand continuing about the same.

Plates.—Some weakness is reported among manufacturers, but the usual price for Tank is 2 50¢ in carload lots, f.o.b. Chicago. Stores report a good demand, but have some difficulty in securing heavy Sheets to supply their customers, as mills are still very full of orders, from three to four weeks being required to get orders through. No change has been made in prices from store.

Sheet Iron.—Most of the business now transpiring in this line is of a retail character. Jobbers report a very good demand and light stocks. They still quote Common Black on a basis of 3 1/2¢ for No. 27, with concessions of 10¢ @ 20¢ 1/2 100 pounds, according to quantity. Galvanized is moving freely in small lots, with jobbers quoting 62 1/2% off for Juniata.

Merchant Steel.—The demand is light, but prices are well sustained at the recent advance. Leading quotations are as follows: Tool Steel, 8 1/2¢ @ 9 1/2¢; Specials, 13¢ @ 25¢; Crucible Spring, 4 1/2¢; Round Crucible Spring, 4 20¢; Open-Hearth Spring, 3 30¢; Open-Hearth Machinery, 2.75¢ @ 3¢; Crucible Sheet Steel, 7¢ @ 11¢.

Steel Rails.—A few railroad companies are making inquiries for next year's delivery, and several thousand tons have been sold for delivery during the coming month. Prices range from \$56 up, according to the time of delivery named.

Old Rails and Wheels.—The supply of Old Rails has increased recently on account of the approach of winter and the desire of railroad companies to get rid of such material before snow interferes. Prices are weak, and while \$22 was realized on some lots sold last week, it would now be difficult to get a bid within a dollar of that rate. Old Car-Wheels are scarce, and no transactions are reported. A nominal quotation is \$20.50.

Scrap Iron.—More business continues to be done in Cast Scrap than in anything else. Some Forge Scrap was sold during the week, but not in quantities of any moment. Steel Scrap is apparently not wanted. Quotations for carefully selected Scrap per net ton of 2000 lb are as follows: Railroad Shop or No. 1 Forge, \$20 @ \$21; Railroad Track, \$19; Mill Iron, or No. 1 Wrought, \$15.50 @ \$16; No. 2 Wrought,

Tank, Flues, &c., \$13.50 @ \$14; Light Wrought, \$10; Machinery Cast, \$15 @ \$16; Stove Plate, \$11 @ \$12; Cast Borings, \$9.75; Wrought Turnings, \$12.50 @ \$13; Coil Steel, \$15; Leaf Steel, \$17; Locomotive Tires, \$20; Horseshoes, \$22; Axles, \$26; Mixed Country Wrought, \$14.

Barb Wire.—Jobbers report a great deal of inquiry for next season and a strong disposition on the part of buyers to place orders, but there is little or no disposition on the part of either manufacturers or jobbers to sell in that way. They prefer to sell for immediate delivery and in less than carload lots. They quote 3 25¢ for Painted and 4¢ for Galvanized, without regard to quantity.

Nails.—Important action has been taken during the past week by the Wheeling manufacturers, all of whom have instructed their agents here to advance prices of Steel Cut Nails to \$2.12 1/2¢. For the present this affects Wheeling Nails only, other Steel Cut Nails being still available at the old rate of \$2 @ \$2.10, but it is generally believed that these low rates will be withdrawn before long. All jobbers in this market have advanced their prices to \$2.15 for Iron and \$2.25 for Steel Cut Nails, with the usual allowance for carload lots, and a further advance is strongly indicated in the near future. A first-rate demand is reported, which is quite unusual for this month, and shows that stocks in retailers' hands are light. A considerable inquiry is reported for carleads. In Wire Nails there is no change, prices being still quoted by jobbers at \$3 @ \$3.10, with an excellent demand.

General Hardware.—The activity in this branch, previously reported, continues in full vigor, and the outlook is regarded as very encouraging. Bright Tin Plates are now quoted at \$5.75 as a close price by jobbers. Shot has also advanced 5¢ per bag at the Shot works, in consequence of the higher price of Lead, and is now quoted by jobbers at \$1.25. Stamped Tinware has been advanced to 75% off, having been previously sold at 75 and 10%, and sometimes 15% and 20%. Copper goods are also higher, in sympathy with the advance in the crude metal. Roofing Plates, Terne, are weaker with the approaching close of the building season. Wagon stock is advancing in its turn, manufacturers asking an average of 10% more than old rates for Hubs and Spokes. Collections are still quoted by jobbers at \$3 @ \$3.10.

Lead.—Sales of Pig Lead were made early in the week at 4.35¢ for some 400 tons, December delivery, but prices weakened subsequently in sympathy with a decline in Eastern markets, and 300 tons were sold at 4.32 1/2¢ and 100 tons at 4.30¢. Spot Lead is very scarce. Some Lead products have advanced in price on account of the higher cost recently of Pig Lead, but Lead Pipe kept down to the old rate and has been sold at less than the current quotations for Pig.

The Raymond Lead Company, Chicago, state that they are meeting with encouraging success in introducing their Shot, which is a comparatively new feature of their trade. Notwithstanding derogatory reports which have been put in circulation relative to the character of the Shot made by them, they now are in constant receipt of orders from the best houses in many sections of the country.

W. S. Mallory & Co., 22 West Randolph street, Chicago, have found their Plate business increasing so considerably that new warehouse room was imperatively needed. They have therefore secured the premises formerly occupied by the American Express Company, adjoining their own warehouse, which will about double their facilities. They are immediately on the line of the Pittsburgh, Fort Wayne and Chicago, the Panhandle, the C. B. and Q. and the Alton railroads.

Chattanooga.

Office of *The Iron Age*, Carter and Ninth Sts., CHATTANOOGA, TENN., November 14, 1887.

The condition of the general markets is materially unchanged since our last report. The marketing of the cotton crops is now going on briskly, which involves a largely increased demand upon the railroad lines for transportation. Notwithstanding the reported easier condition of the money market in other sections, money here is apparently as close as ever, and many good customers are turned aside by the banks when asking for discounts on business paper. This stringency may perhaps be practically accounted for by the many new enterprises begun by parties who have not sufficient means of their own to carry out fully what they have undertaken and are obliged to borrow. It is thought by many that the proceeds of the cotton crop, which will probably exceed \$200,000,000, will in a great measure relieve the stringency, but it has seldom proved so in the past, as all such receipts are in a great measure hypothecated.

Old Rails and Wheels.—The supply of Old Rails has increased recently on account of the approach of winter and the desire of railroad companies to get rid of such material before snow interferes. Prices are weak, and while \$22 was realized on some lots sold last week, it would now be difficult to get a bid within a dollar of that rate. Old Car-Wheels are scarce, and no transactions are reported. A nominal quotation is \$20.50.

Scrap Iron.—More business continues to be done in Cast Scrap than in anything else. Some Forge Scrap was sold during the week, but not in quantities of any moment. Steel Scrap is apparently not wanted. Quotations for carefully selected Scrap per net ton of 2000 lb are as follows: Railroad Shop or No. 1 Forge, \$20 @ \$21; Railroad Track, \$19; Mill Iron, or No. 1 Wrought, \$15.50 @ \$16; No. 2 Wrought,

Cincinnati.

Office of *The Iron Age*, Fourth and Main Sts., CINCINNATI, November 14, 1887.

Pig Iron.—There has been no animation in the local market for Pig Iron during the past week, and large transactions have been conspicuous only by their absence; yet there has been a fair run of small orders for both Mill and Foundry grades, and a good inquiry for Car-Wheel Iron. The market is apparently tending downward, and buyers are not slow to recognize any change, however slight, which is in their favor, but there are many points which sustain sellers in their views that it is difficult to come to a definite conclusion respecting the facts; one of the strongest elements in favor of sellers is the evident desire of buyers to make contracts at any appreciable decline from present prices. But, for the present, buyers are affecting indifference respecting the future, and producers, too, are bending their energies rather toward a consumption of business on hand than to procuring new contracts. The lack of available cars in which to make prompt shipment of Iron continues to be a very embarrassing feature. It is stated that No. 2 Southern Foundry Iron, while it is held at \$20, cash, for prompt delivery, is obtainable at \$19.50 for next year; and No. 2 Mill Iron, while firm at \$17, spot cash, could probably be shaded slightly for contracts embracing most of next year, yet there were some sales for present delivery this week at \$17.25, cash, here.

Charcoal Foundry.

Hanging Rock, No. 1.....	\$23.00 @ \$24.00
Hanging Rock, No. 2.....	22.00 @ 23.00
Southern, No. 1.....	21.00 @ 22.00
Southern, No. 2.....	20.00 @ 21.00

Coal and Coke Foundry.

Ohio Soft Stonecoal, No. 1.....	20.00 @ 21.00
Ohio Soft Stonecoal, No. 2.....	19.50 @ 20.00
Southern Coke, No. 1.....	20.50 @ 21.00
Southern Coke, No. 2.....	20.00 @ 20.50
Ohio and West Pennsylvania Coke, No. 1.....	19.00 @ 19.50
Ohio and West Pennsylvania Coke, No. 2.....	21.00 @ 22.00

Forge.

Strong Neutral Coke.....	17.00 @ 17.50
Mottled.....	16.00
Southern Coke.....	17.00 @ 17.50

Car-Wheel and Malleable Irons.

Southern Car-Wheel.....	24.00 @ 26.00
Hanging Rock, Coal Blast.....	25.00 @ 27.00
Hanging Rock, Warm Blast.....	24.00 @ 25.00
Lake Superior Malleable.....	23.50 @ 24.50

Old Rails and Wheels.—There has been but little trading in this class of Iron recently, and an easier tone has resulted from larger offerings rather than from a falling off in the demand, although that too has assisted the decline. Old Rails could probably be bought at \$23.50, and Old Wheels are not quotable over \$20 @ \$20.50 per ton.

Nails.—There has been a moderate bidding for Nails and a steady market, too @ 600 selling at \$2 @ \$2.10 per kg, and Steel at \$2.10 @ \$2.20 per kg, and other sizes at proportionate rates; the inside sizes for carlots.

Manufactured Iron.—There has been no decrease in the volume of business in this branch of the Iron industry, and a firm tone has prevailed throughout with full prices obtained. We quote: Bar Iron, 2¢; Charcoal Bar Iron, 3¢; Sheet Iron, Boiled, Nos. 10 to 27, 2 1/2¢ @ 3.30¢; Sheet Iron, Charcoal, Nos. 15 to 25, 3 1/2¢ @ 4 1/2¢ per lb.

St. Louis.

ST. LOUIS, November 14, 1887.

Pig Iron.—There is little change in the market since last report. Prices are perhaps a shade firmer, but not so many orders are being booked. Most buyers are waiting very patiently for the expected decline. Southern Coke Foundry Irons are still scarce, with Southern Charcoal Irons quite plentiful. Bessemer Iron is considerably off. Southern Charcoal Foundry and Coke Irons are selling at from \$20 to \$21, cash, on cars here, according to the delivery and brand. Mill Iron \$18 @ \$19. Ohio Softeners are still quoted by jobbers at \$3 @ \$3.10.

Iron Ore.—A few small orders have been booked for shipment during the winter months.

Old Rails.—There is no inquiry. Holders are asking \$25, but will probably accept \$21 off, possibly \$1.50. It is rumored here that an order for 40,000 tons new Steel Rails was placed at \$30, cash, at mill, within the past 10 days. This has had a very depressing effect upon Bessemer Pig Iron, as well as Old and New Rails.

Old Wheels.—The market is a little weaker, and Old Wheels can now be bought at about \$20.50, cash, on the cars here.

Barb Wire.</

Lemon Squeezers.	Porcelain Lined, No. 1.	W. dos. \$6.00. dis 25&30 %
Wood, No. 2.	W. dos. \$6.00. dis 25&30 %	
Wood, No. 3.	W. dos. \$1.70. at 1.75	
Doulop's Improved.	W. dos. \$3.75. dis 20 %	
Sammis', No. 1. \$5; 2, \$9; 13, \$18. W. dos. dis 25&30 %		
Jennings' "Star".	W. dos. \$2.25	
The Boss.	W. dos. \$1.50	
Dean's.	W. dos. \$1.50	
Little Giant.	dis 50 % at 50&5 %	
King.	dis 50&5 %	
Lines.	Cotton and Linen Fish, Draper's.	dis 50 %
Drawn Chalk.	dis 50 %	
Draper's Mason's Linen, 84 ft., No. 1. \$1.25; No. 2. \$1.75; No. 3. \$2.25; No. 4. \$2.75; No. 5. \$3.25; dis 25&30 %		
Cotton Chalk.	dis 50 %	
Satin Chalk.	dis 50 %	
Boiler Tubes, Iron.	dis 50 %	
Wood Planes and Plane Irons.	Molding.	dis 40&10 % at 50 %
Bench, First Quality.	dis 50&5 % at 50&10 %	
Bench, Second Quality.	dis 40&10 % at 50 %	
Perkins' Burgee Proof.	dis 30&10 %	
Plane Irons.	dis 30&10 % at 50&10 %	
F. Manly's "Extension Cylinder".	\$10.50. W. dos.	
Barnes Mfg. Co.	dis 40 %	
Plane Irons, Butcher's.	dis 30 %	
Plane Irons, Middlesex Mfg. Co.	"Baldwin Iron," Single and Cut.	
Dietrich's.	dis 30&10 %	
L. & C. Round Key Latches.	dis 30&10 %	
L. & C. Flat Key Latches.	dis 33&10 %	
Romer's Night Latches.	dis 20 %	
Yale new list.	dis 40 %	
"Sister" of U. S.	dis 40 %	
"Feltier" or "American".	dis 40 %	
Seed's N. Y. Hasp Lock.	dis 25 %	
Cabinets.	Eagle, Gaylord Parker and [list March '84, revised Corbin's.	Jan. 1. \$85. dis 33&2 %
Deits, Nos. 36 to 39.	dis 40 %	
Deits, Nos. 51 to 63.	dis 40 & 10 %	
Deits, Nos. 86 to 90.	dis 40 %	
Stoddard's Locks.	dis 30 % to 33&4 %	
"Champion" Night Latches.	dis 40 %	
Barnes Mfg. Co.	dis 40 %	
Eagle and Corbin Trunk.	dis 25&2 %	
"Champion" Cabinets and Combination.	dis 33&4 %	
Tale.	dis 33&4 %	
Romer's.	dis 25 %	
Padoxes.	dis 30 % to 33&4 %	
List, Dec. 23. 84.	dis 60&5 % at 50&10 %	
Yale Lock Mfg. Co.	dis 23&4 %	
Eagle.	dis 25&2 %	
Eureka, Eagle Lock Co.	dis 40&2 %	
Romer's. Nos. 0 to 91.	dis 35 %	
Romer's, Nos. 200 to 505.	dis 40 %	
R. D. Dietrich's.	dis 40 %	
"Champion" Padlocks.	dis 40 %	
Hotchits.	dis 30 %	
Hotchits.	dis 30 %	
"Star".	dis 40 %	
"Purse" Box.	dis 40 %	
Barnes Mfg. Co.	dis 40 %	
Nock's.	dis 30 %	
Brown's Patent.	dis 1.5 %	
Scandinavian.	dis 10&5 %	
Scandinavian, new list (low).	dis 60 %	
Lumber Tools.	Ring Peaves, "Blue Line" Finish.	W. dos. \$20.00
Ring Peaves, Common Finish.	W. dos. \$18.00	
Steel Socket Peaves.	W. dos. \$21.00	
Mail.	W. dos. \$20.00	
Cant Hooks, "Blue Line" Finish.	W. dos. \$16.00	
Cant Hooks, Common Finish.	W. dos. \$14.00	
Cant Hooks, Mail. Sockel Clasp, "Blue Line" Finish.	W. dos. \$16.00	
Cant Hooks, Mail. Sockel Clasp, Common.	W. dos. \$16.00	
Flush.	W. dos. \$14.50	
Cant Hooks, Clip Clasp, "Blue Line" Fin.	W. dos. \$14.00	
Cant Hooks, Clip Clasp, Common Finish.	W. dos. \$12.00	
Hand Poles.	W. dos. \$15.00	
Pike Poles, Pike & Hook.	12 ft. 14 ft. 16 ft. 18 ft. 20 ft.	
W. dos. \$11.50. 12.50. 14.50. 17.50. 21.50. 25.00.	10.00. 11.00. 13.00. 16.00. 20.00.	
Pike Poles not round.	6.00. 7.00. 9.00. 12.00. 16.00.	
Setting Poles.	14.00. 15.00. 17.00.	
wand Hooks.	W. dos. \$15.00	
Landing Sticks.	W. dos. \$15.00	
Wainscot Nails.	W. dos. \$15.00	
Ring Binders.	W. dos. \$20.00	
Bended Roof Calks, 1 to 5 M.	dis 25 %	
5 to 10 M. dis 30 %		
Square Roof Calks.	W. dos. \$15.00	
Chimney Dogs.	W. dos. \$12.50	
Wing Raffing Dogs.	W. dos. \$10.00. large. \$12.50	
Timber Grappling.	W. dos. \$20.00	
Casters.	Four-ounce Bottles.	W. dos. \$1.75. W. gro. \$1.70
Mallets.	Hickory.	dis 20&10 % to 10&20 %
Hickory.	W. dos. \$1.75. dis 20&10 % to 10&20 %	
Penfield Mfg. Co. Hickory and L. V.	dis 20 to 30 %	
Wicks.	Regular Hat.	dis 60&5 % to 60&10 %
Men's Cutters.	Nos. 1 2 3 4	dis 20 & 30 %
Dixon's—Nos.	dis 14.00. 17.00. 19.00. 30.00. 35.00.	dis 45 %
Woodruff's.	Nos. 100.	dis 45 %
Woodruff's.	W. dos. \$11.00. 12.00. 13.00. 14.00.	dis 45 %
Pike Poles.	12 ft. 14 ft. 16 ft. 18 ft. 20 ft.	
W. dos. \$11.50. 12.50. 14.50. 17.50. 21.50.	10.00. med. \$10.00. large. \$12.50	
Pike Poles, Pike only.	W. dos. \$10.00.	
Pitcher Spout.	6.00. 7.00. 9.00. 12.00. 16.00.	
Setting Poles.	14.00. 15.00. 17.00.	
wand Hooks.	W. dos. \$15.00	
Landing Sticks.	W. dos. \$15.00	
Wainscot Nails.	W. dos. \$15.00	
Ring Binders.	W. dos. \$20.00	
Bended Roof Calks, 1 to 5 M.	dis 25 %	
5 to 10 M. dis 30 %		
Square Roof Calks.	W. dos. \$15.00	
Chimney Dogs.	W. dos. \$12.50	
Wing Raffing Dogs.	W. dos. \$10.00. large. \$12.50	
Timber Grappling.	W. dos. \$20.00	
Casters.	Four-ounce Bottles.	W. dos. \$1.75. W. gro. \$1.70
Mallets.	Hickory.	dis 20&10 % to 10&20 %
Hickory.	W. dos. \$1.75. dis 20&10 % to 10&20 %	
Penfield Mfg. Co. Hickory and L. V.	dis 20 to 30 %	
Wicks.	Regular Hat.	dis 60&5 % to 60&10 %
Men's Cutters.	Nos. 1 2 3 4	dis 20 & 30 %
Dixon's—Nos.	dis 14.00. 17.00. 19.00. 30.00. 35.00.	dis 45 %
Woodruff's.	Nos. 100.	dis 45 %
Woodruff's.	W. dos. \$11.00. 12.00. 13.00. 14.00.	dis 45 %
Pike Poles.	12 ft. 14 ft. 16 ft. 18 ft. 20 ft.	
W. dos. \$11.50. 12.50. 14.50. 17.50. 21.50.	10.00. med. \$10.00. large. \$12.50	
Pike Poles not round.	6.00. 7.00. 9.00. 12.00. 16.00.	
Setting Poles.	14.00. 15.00. 17.00.	
wand Hooks.	W. dos. \$15.00	
Landing Sticks.	W. dos. \$15.00	
Wainscot Nails.	W. dos. \$15.00	
Ring Binders.	W. dos. \$20.00	
Bended Roof Calks, 1 to 5 M.	dis 25 %	
5 to 10 M. dis 30 %		
Square Roof Calks.	W. dos. \$15.00	
Chimney Dogs.	W. dos. \$12.50	
Wing Raffing Dogs.	W. dos. \$10.00. large. \$12.50	
Timber Grappling.	W. dos. \$20.00	
Casters.	Four-ounce Bottles.	W. dos. \$1.75. W. gro. \$1.70
Mallets.	Hickory.	dis 20&10 % to 10&20 %
Hickory.	W. dos. \$1.75. dis 20&10 % to 10&20 %	
Penfield Mfg. Co. Hickory and L. V.	dis 20 to 30 %	
Wicks.	Regular Hat.	dis 60&5 % to 60&10 %
Men's Cutters.	Nos. 1 2 3 4	dis 20 & 30 %
Dixon's—Nos.	dis 14.00. 17.00. 19.00. 30.00. 35.00.	dis 45 %
Woodruff's.	Nos. 100.	dis 45 %
Woodruff's.	W. dos. \$11.00. 12.00. 13.00. 14.00.	dis 45 %
Pike Poles.	12 ft. 14 ft. 16 ft. 18 ft. 20 ft.	
W. dos. \$11.50. 12.50. 14.50. 17.50. 21.50.	10.00. med. \$10.00. large. \$12.50	
Pike Poles, Pike only.	W. dos. \$10.00.	
Pitcher Spout.	6.00. 7.00. 9.00. 12.00. 16.00.	
Setting Poles.	14.00. 15.00. 17.00.	
wand Hooks.	W. dos. \$15.00	
Landing Sticks.	W. dos. \$15.00	
Wainscot Nails.	W. dos. \$15.00	
Ring Binders.	W. dos. \$20.00	
Bended Roof Calks, 1 to 5 M.	dis 25 %	
5 to 10 M. dis 30 %		
Square Roof Calks.	W. dos. \$15.00	
Chimney Dogs.	W. dos. \$12.50	
Wing Raffing Dogs.	W. dos. \$10.00. large. \$12.50	
Timber Grappling.	W. dos. \$20.00	
Casters.	Four-ounce Bottles.	W. dos. \$1.75. W. gro. \$1.70
Mallets.	Hickory.	dis 20&10 % to 10&20 %
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Wicks.	Regular Hat.	dis 60&5 % to 60&10 %
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Dixon's—Nos.	dis 14.00. 17.00. 19.00. 30.00. 35.00.	dis 45 %
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Woodruff's.	W. dos. \$11.00. 12.00. 13.00. 14.00.	dis 45 %
Pike Poles.	12 ft. 14 ft. 16 ft. 18 ft. 20 ft.	
W. dos. \$11.50. 12.50. 14.50. 17.50. 21.50.	10.00. med. \$10.00. large. \$12.50	
Pike Poles, Pike only.	W. dos. \$10.00.	
Pitcher Spout.	6.00. 7.00. 9.00. 12.00. 16.00.	
Setting Poles.	14.00. 15.00. 17.00.	
wand Hooks.	W. dos. \$15.00	
Landing Sticks.	W. dos. \$15.00	
Wainscot Nails.	W. dos. \$15.00	
Ring Binders.	W. dos. \$20.00	
Bended Roof Calks, 1 to 5 M.	dis 25 %	
5 to 10 M. dis 30 %		
Square Roof Calks.	W. dos. \$15.00	
Chimney Dogs.	W. dos. \$12.50	

Trade Report.

General Hardware.

The further advance of the season brings with it little, if any, diminution in the volume of business, trade continuing exceptionally good for the time of year. Prices remain without material change, there being but few important fluctuations. Collections generally are reported fair. The special features of the market are referred to below.

NAILS.

More inquiries are reported for Nails and more orders are being placed. Prices, however, have not advanced, though in a general way the tone of the market is a little better. The somewhat improved condition of affairs may, perhaps, be explained by the falling off in the make, both East and West. We continue to quote carload lots of standard Nails at \$2, with outside Nails selling a little lower. For small lots from store prices are from \$2 to \$2.05 per keg. A regular monthly meeting of the Atlantic States Nail Association was held in this city last Thursday, but nothing of importance was done.

WIRE NAILS.

There continues to be, as for some time past, some irregularity in the price of the Standard Wire Nails, the largest manufacturers for the most part holding them pretty evenly at ruling prices. During the past week there has been a slight shading of former prices. The demand is good, and the use of the Nails regarded as steadily increasing. The Nails may be quoted at \$3 to \$3.10 for small lots, with a base of \$2.80 at factory for carload lots.

BARB WIRE.

The market continues to be irregular, with a light demand, which is not expected to increase immediately to any considerable extent. Prices for this market are without change, but Western makers have been quoting prices which considerably shade those recently made.

MISCELLANEOUS PRICES.

Emmick & Hatcher, manufacturers of the Columbus Wrought Steel Thimble Skein, have adopted, under date November 1, a revised and reduced list, which we give below, the list being subject to a discount of 20 per cent., net 60 days, or 2 per cent. off for cash in 10 days:

Price List of Skeins with Nuts or Burrs.

Size.	Thickness of Steel in inches.	Diameter at point of Box, in inches.	Price per set of 4, with Boxes, complete.
2 1/4 x 7	7/64	1 11/16	\$3.52
2 1/4 x 7 1/2	7/64	1 15/16	3.68
2 1/4 x 8	7/64	2 1/16	4.12
2 1/4 x 8 1/2	7/64	2	4.28
2 1/4 x 9	7/64	1 15/16	4.46
3 x 9	7/64	2	4.68
3 x 10	9/64	1 15/16	4.74
3 1/4 x 9	9/64	2 1/16	5.30
3 1/4 x 10	9/64	2 3/16	5.44
3 1/4 x 11	9/64	2 1/2	5.54
3 1/4 x 12	9/64	2 7/16	5.94
3 1/4 x 13	9/64	2 15/16	6.12
3 1/4 x 14	9/64	3 1/16	6.20
3 1/4 x 15	9/64	2 1/2	6.36
3 1/4 x 16	9/64	2 1/2	6.44
3 1/4 x 17	9/64	2 7/16	6.92
4 x 12	5/32	2 11/16	7.64
4 1/4 x 12	5/32	2 3/16	8.82
4 1/4 x 12	6/32	3 3/16	10.32
4 1/4 x 12	6/32	3 1/2	10.40
5 x 12	7/32	3 1/2	15.20

Price List of Skeins with Linch Pins and Washers.

Size.	Thickness of Steel in inches.	Diameter at point of Box, in inches.	Price per set of 4, with Boxes, complete.
2 1/4 x 7	1/16	1 11/16	\$3.52
2 1/4 x 7 1/2	1/16	1 15/16	3.68
2 1/4 x 8	1/16	2 1/16	4.12
2 1/4 x 8 1/2	1/16	2	4.28
2 1/4 x 9	1/16	1 15/16	4.46
3 x 9	1/16	2	4.68
3 x 10	1/16	1 15/16	4.74
3 1/4 x 9	1/16	2 1/16	5.30
3 1/4 x 10	1/16	2 3/16	5.44
3 1/4 x 11	1/16	2 1/2	5.54
3 1/4 x 12	1/16	2 7/16	5.94
3 1/4 x 13	1/16	2 15/16	6.12
3 1/4 x 14	1/16	3 1/16	6.20
3 1/4 x 15	1/16	2 1/2	6.36
3 1/4 x 16	1/16	2 1/2	6.44
3 1/4 x 17	1/16	2 7/16	6.92
4 x 12	5/32	2 11/16	7.64
4 1/4 x 12	5/32	2 3/16	8.82
4 1/4 x 12	6/32	3 3/16	10.32
4 1/4 x 12	6/32	3 1/2	10.40
5 x 12	7/32	3 1/2	15.20

The prices of Augers and Bits are no firmer, and it is regarded as probable that the negotiations which have been going on in regard to some agreement for solidifying prices will have to be abandoned. Two at least of the leading manufacturers are unwilling to enter into such an arrangement as was proposed, and this fact, together with other difficulties, has interfered with the carrying out of the plans, for the success of which the prospect from the first was not promising.

Lower prices on Hollow Ware are ruling, and some of the manufacturers are offering to take orders at extremely low figures, the goods to be specified for now and delivered between this time and April.

The prices for Tacks have for some time continued quite steady, there being but little variation in the quotations on the leading goods, which some time ago were put at as low figures as the cost of manufacture would justify. Some of the other goods, however, were for some time held by the manufacturers at prices that afforded a good margin of profit, but on many of these the close competition has gradually reduced the price

considerably, and it is now claimed by the manufacturers that they are sold at as low figures as can be afforded. The volume of business is referred to as fair, and with the large capacity of the different works nearly all the manufacturers could do much more than they are doing.

The Cordage market is quiet, the demand being comparatively light. Prices are rather weaker than they have been. This is the case especially with Manila, which is about $\frac{1}{4}$ cent per pound lower.

The following are the prices on the Butcher and other Knives with protectors manufactured by Richard G. Lewis, Chillicothe, Ohio, and alluded to in another column:

Per doz.
6 1/2
7 1/2
8 1/2
9 1/2
10 1/2
11 1/2
12 1/2

6 1/2 Knives, with protector.

7 1/2 Knives, with protector.

8 1/2 Knives, with protector.

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70 1/2 Knives, with protector.

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Trade Report.

Agricultural Implements, Railway, Machinists', Engine and Boiler-makers' Supplies, Founders, Wagon and Carriage-makers, Blacksmiths, Brassworkers, Plumbers and dealers in Plumbers' Steam and Gas-fitters' Supplies, Stoves, Tin, Cutlery, Guns, Jewelry, House-furnishing Goods and workers in Iron, Metals and kindred branches of trade generally in the United States and Canada, with ratings indicating their financial standing. Comparing it with former issues it is evident that it has been carefully revised and rendered more complete, and the volume will doubtless be found of special value to the Hardware and Iron trades.

GOULD & AUSTIN.

The following is the discount sheet of Goulds & Austin, Chicago, Ill., bearing date November 10:

Steel Goods.

	Discount.
Steel Goods.	70&5%
Coke Forks.	20%
Hay Knives (Electric), Iron Back, doz. net.	37.00
Hay Knives (Electric), Steel Back, doz. net.	39.00
Shovels and Spades.	
Annesbury Shovels and Spades, D. H. - Polished, Sacked and Sharpened Socket Strap, weight 62 to 64 pounds $\frac{1}{2}$ doz., subject to stock, doz. net.	37.00
Balance Annesbury (use Austin list).	40&10%
Farmers' Friend, D. H. Polished.	34.90
Balance Farmers' Friend List.	50%
Austin Drain Spades (O. Annes pattern) subject to stock.	50%

Hay Tools.

Milwaukee Reversible Hay Carriers	\$3.50
Harris Double Harpoon Forks	.90
Knot Pulleys	2.75
Ansley Pulleys, 5 inch, \$1.75; 6 inch, doz. net.	1.90
Hanger Hooks 18 inch, doz. net.	.75
Hanger Hooks, 16 inch, doz. net.	.55
Rafter Iron Hooks, doz. net.	.55
Mal. Rafter Irons, doz. net.	.55
Flo. r Hooks doz. net.	.75
Turner's Tight fit Binder Covers, 8-oz. West Point, each.	32.25
Turner's Tight-fit Separator Covers.	25%
Stack and General Purpose Covers, Bear Duck, 15%.	
Stack and General Purpose Covers, West Point Duck.	38.5%
Hay Cock Covers	5.50
Queen Cockle Mills, net.	5.00
Strowbridge Seeders, net.	14.00
Austin 11-foot Seeder, net.	14.50
Calhoun Hand Seeder, each.	3.25
Shelvers.	
Tony Shellers, Plain, \$5.25; with Fan.	5.75
Feed Tables.	.35
Tony Shellers, plain, with pulley, net.	7.00
Hocking Valley Sheller, plain, \$5.25; with Fan.	5.75
Hocking Valley Sheller, two hole, complete.	12.50
Burrall Iron Shellers, net.	4.00
Horse Powers and Jacks as per special circular only (Catalogue list and description not copied).	
4-Horse-Powers, with 2 Levers, 2 Couplings.	
Tumbling Rod.	39.70
Jack for some, with 15-inch pulley.	39.70
2-Horse-Power, 1 Lever, 2 Couplings 1, Tumbling Rod.	39.70
Jack for some, with 15-inch pulley.	6.00
1-Horse-Power, 1 Lever, 2 Couplings, 1 Tumbling Rod.	19.00
Jack for some, with 15-inch pulley.	6.00
Racing Farm Mills, 55&5%; extras.	40%
Warehouse, 35&5%; extras.	30%
Racing Dustless Separators.	30%
Peckham's Furnaces and Cauldrons.	30%
Feed Mills and Cutters.	
Feed Mills, Send for circular.	
Ross Feed Cutters, No. 17 and smaller. See new circulars.	40%
Ross Joint Cutters.	15%
Ross Carriers.	40&10%
Lard Presses.	40&10%
Cider Mills, Senior, \$10.50; Junior.	10.50
Bob Sleds.	15.00
Wheel Barrows.	
Common Barrows, Wood Wheel, Bent Fel- low, doz. net.	\$11.00
Clinax Barrows, Wood Wheel, \$15; Iron Wheel doz. net.	17.00
Kilbourne & Jacobs' Bolted Barrows, net.	
Write for Special Circular.	
Kilbourne & Jacobs' Steel Wheels per doz. extra.	\$16.00
Perfect Bolted Barrows, per doz.	15.00
Perfect Garden Barrows, per doz.	25.00
Daisy Garden Barrows, per doz.	22.00
Stone Barrows, B. H. with Jacobs' patent wheel, Kilbourne & Jacobs, doz. net.	38.00
Steel Tray Stone Barrows, each net.	6.00
Wood Stave or Bar Barrows, \$4.00; Birch Bark, not each.	6.00
K. & J. Mortar Barrows, doz. net.	25.00
Steel Tray Barrows, No. 1, \$1.50; No. 2, each net.	35.50
Tubular Barrows.	.40
Steel Tubular Barrows.	.45
Brick Hods, \$4.00; Mortar Hods, dozen.	6.00
Barrel Carts, without bbls.	3.00
Scrapers.	
Steel Bottom Scrapers, 30 in., \$3.40; 32, \$3.50; 34, net.	
Slusher All Steel Scrapers, No. 1, \$6.00; No. 2, 5.50	
Columbus Solid Steel Scraper, No. 1, \$6.25;	
No. 2, \$5.75; No. 3.	5.25
Runners for Columbus Scrapers, extra, per pair, net.	50.50
Chicago Scraper and Dredge, 15%.	
Common Wheel Scraper, pressed, bowl No. 2 \$8; No. 3.	34.00
Township or Breaking Plow, \$14, Road or Grading Plow, net.	118.00
Mammoth Railroad Plow.	45.00
Hand Carts.	35
Warehouse and Store Truck Nos. 0 and 1, 55%	
and 5 1/2; 60&5%.	
Wagon Trucks, 60&5%.	60&10%
Barrel Trucks, 60&5% Bag Trucks, net.	50&5%
Malleable Tackle Blocks, Revised List.	50&5%
Champion Blowers, same list as Buffalo.	50&5%
Champion Blowers, same list as Buffalo.	35%
Governors, Steam Pumps, &c.	
Gardner Governor.	25%
Duplex Steam Pumps.	25%
Boyle Boiler Feeders.	50%
Injectors.	35%
Centrifugal Pumps.	35%
Galvanized Pressure Pipe.	45%
Fittings.	
Cast Iron Elbows, Tees, Crosses, Reducers, Caps.	65%
Plugs and Bushings.	70&5%
Locust Flanges, Unions, Return Bends, Y Bends.	65%
Branch Tees and Hook Plates.	65%
Ceiling and Floor Plates.	65%
Wrought-Iron Couplings 65%, Nipples.	75%
Malleable Unions.	57 1/2%
Malleable Fittings, pound list 10. Flanges.	67 1/2%
Malleable Fl. fittings, Picot List.	67 1/2%
Iron Valves and Cocks.	
Globe and Angle Valves, Iron Body.	65&5%
Cross, Check, Safety and Back Pressure Valves.	65&5%
Butterfly Valves.	65%
Radiator Air Valves, Compression.	65%
Radiator Air Valves, Automatic, Davis.	30%
Brass Cocks.	65%
Brass Valves.	
Brass Globe and Angle Valves.	65%
Brass Globe and Angle Valves, Jenkins' Disk.	60%
Cross, Check and Safety and Hose Valves.	65%
Butterfly Valves.	65%
Radiator Air Valves, Compression.	65%
Radiator Air Valves, Automatic, Davis.	30%
Brass Cocks.	65%
Hand and House Force Pumps.	
Hand Force Pumps, Iron, 50%; brass.	45%
Vertical Power Piston Pump, 40%; Globe Pump.	45%
Single-Action House Force Pump, Iron, 50%; brass.	50%
Double-Action House Force Pump, Iron, 45%; brass.	45%
Railroad and Ship Pumps.	
Star R. R. Force Pump, 45%; Meteor.	45%
Counter Shafts, 25; Cornish Head.	30%
Deep-Well Cylinders.	35%
Alert Double-Action Pump.	50%

THE IRON AGE.

Engine Trimmings.

Compression and Mississippi Gauge Cocks.	60
Common Lubricators and Oil Cups.	65
Register Gauge Cocks, List 10, \$1; \$4.	60
Felthousen Gauge Cocks.	50
Cylinder Cocks, Straight or Bibb.	65
Cylinder Cocks, with Coupling, List Pipe Size, 3/8, \$1.75; 1/2, \$2.25; 3/4, \$3.	60
Steam Gauge Cocks.	65
Water Gauges.	65
List 2 Rod Rough, 6x 12 glass, 1/2 Pipe.	\$3.00
List 2 Rod Finished, 6x 12 glass, 1/2 Pipe.	5.75
List 4 Rod Finished, 6x 12 glass, 1/2 Pipe.	6.00
List 4 Rod Finished, 3/4 x 16 glass, 3/4 Pipe.	10.00
Scotch Glass Tubes.	75
Steam Whistles and Spires, except below.	65%
Mocking Bell Whistles.	15
Single Bell Chime Whistles.	15
No. 1. No. 2. No. 3.	
Without Up- With Up- Valve. right Valve. Valve.	
List Diam. 2. \$5.00 \$6.50 \$7.50	
List Diam. 3. 8.00 9.50 11.00	
List Diam. 4. 14.00 16.00 18.00	
List Diam. 5. 22.00 25.00 28.00	
List Diam. 6. 30.00 35.00 38.00	
List Diam. 10. 110.00 130.00 140.00	
List Diam. 12. 150.00 180.00 200.00	
Steam Gauges.	50
Except No. 10, per dozen.	
\$27.	
Lunkenheimer Goods.	
Lunkenheimer Redgrinding Valves.	60
Lunkenheimer Jenkins' Disk Valves (Jenkins List).	65
Lunkenheimer Radiator Valves.	60
Lunkenheimer Radiator Valves, Jenkins' Disk.	60
Lunkenheimer Peet Gate Valves.	65
Lunkenheimer Balance Throttle Valves.	45
1 1/4 1/2 2 2 1/2 3	
List. 7.50 8.50 9.00 10.00 12.00 16.00	
Lunkenheimer Lock Safety Valve.	50
Lunkenheimer Automatic Cylinder Valves.	50
Cody Oilers.	45
Loose Pulse Oilers.	45
Plain Oil Cups, Hinge Lid.	50
Lunkenheimer's Plain and Slide Top Cups.	55
Lunkenheimer's Automatic Cups.	55
Thompson Oil Pumps.	55
Lunkenheimer's Index Lever Cups.	55
Lunkenheimer's Needle Valve Oilers.	55
Lunkenheimer's Automatic Sight Feed Lubri- cators.	50
Tools.	
Baxter Wrenches.	35
Bemis & Call Wrenches.	37 1/2
Alligator Wrenches.	50
Sawmill Wrenches.	35
1/2 in. & 1 1/2 in. Common Tongue.	
Brown's Tongue, List No. 1, \$1.30; 1 1/2, \$1.65	
2 1/2, \$2; 3, \$2; 4, \$2; 5, \$1.11; 6, \$2.25.	
15	
Acme Tongue, 1 1/2. Robbins' Tongue.	
Lifting and Skidding Tongue.	15
Barner's Cutters, 50%, Stanwood Cutters.	50&10
Saunders' Cutters.	62 1/2
Die Plates and Dies.	62 1/2
Taps, 1/2 to 2, 70&10%.	2 1/2 and 3.
Reamers, 1/2 to 2, 70 & 10%.	2 1/2 and 3.
60&10	
Duplex Die Stock.	40
Lightning Taps and Dies.	40
Pump Plates.	40
Pump Plates and Dies.	40
Pump Plates.	40
Pump Plates.	40
Forber Die Stocks.	40
Pipe Machines.	special
Ratchets, low Hat, 40%; Ratchet Wrenches.	39 1/2
Pipe Vise.	40&10
Little's Pipe Holder, 15%; Watson's Improved Pipe Lifter.	
Water Works and Plumbers' Go ds.	
Water Goods Key-word.	60
Water Goods, Compression.	57 1/2
Iron Sinks, plain, 60&5%; Galvanized, 40%; Enamelled.	50&5
Steel Sinks, painted, 35%; Galvanized and En- ameled.	50&5
Globe Ventilators.	40
Crescent Hydrants and Street Washers.	70&5
Wall Hydrants.	55
Curb Boxes.	50&10
Well Machinery.	
Drilling Machines—Prices on application.	
Hydraulic Outfits.	20
Outfit, Fig. A28.	15
Outfit, Fig. A-9.	20
Horse-Power 2-horse and 4-horse, single gear.	
40% balance.	
Expanding Drills.	
Drill, Fig. A30.	30
Cross Drill, Fig. A30.	30
Steel Shoes.	60
Stuffing Boxes.	50
Hydraulic Rods.	Special
Wood Rod Coupling, Plain, 13/2%; Galvan- ized.	18
Tubular Well Valves, 2 inch, per set.	\$1.75
Blind and Lever Well Valves.	50
Pipe Pullers, No. 2, net \$2 balance.	25
Hole and Grab Hook.	25
Tube Well Combinations—2 in. Fig. A56, net.	\$7
Tube Well Combinations—2 in. Fig. A56, net.	\$6
Augers, Twist and Ribbon.	55
Drill Jars.	30
Hercules Machines, No. 1.	20



Hardware Dealers Take Notice,

and buy where you can get the best quality at the lowest price, thereby not only satisfying your customers, but also putting money in your own pocket.

Our Eureka Patent Flexible Back Saws, the teeth of which are hard, the back being soft, thereby preventing them from breaking in two, have been greatly improved and are giving the best satisfaction. Our Crescent brand of Hack Saws are hardened all through with uniform temper, and are the best Hack Saws so tempered.

We are now preparing to supply the wants of the trade according to their preference. Hardware Dealers run no risk by buying from us either our Eureka or Crescent brand of Hack Saws on our recommendation, as we give them the option of returning the first lot to us at our own expense any time within three months from date of invoice. Correspondence solicited.

Henry G. Thompson & Sons,

Cor. Elm and State St., New Haven, Conn.,

—MANUFACTURERS—

Flexible Back Band Saws for Cutting Metals,
Hack, Meat and Kitchen Saws and Frames.

SEND FOR CIRCULAR.

BRANCH OFFICE, 51 Leonard St., New York City.



Adams Swing.

The popularity of the Adams Swing in the short time it has been introduced is phenomenal.

The Swing is constructed on original mechanical principles. The frame is so designed as to be portable from one place to another, even if the boats are to be transported from one place to another, a feature not possessed by any other swing manufactured. There are two sizes manufactured, adapted for both lawn and parlor. No. 1, or largest size has standards 7 feet long, and a frame width of about 4 feet and 5 feet in width. The frame work is so constructed that by taking out two bolts the standards will close up, and by taking out the bolts of the two corners of the frame can be closely folded ready for shipping. The Swing is 4 feet up or taken down ready for packing in 10 minutes.

The weight of the Swing is a little less than 100 pounds. It is very strong, having been tested by four men whose weight aggregated over 800 pounds.

The No. 2, or parlor size, has standards about 7 feet long, and otherwise proportions are the same, weighing less than 75 pounds. They combine simplicity of construction, beauty and strength, and can be operated with ease by small children in the swing.

For Sale by all Leading Dealers.

A. E. DEITZ. GOODELL LATHE.

Many kinds of Scroll Saws have been put on the market by ourselves and other manufacturers during the past twelve years. Of these only a few have proved good enough to remain in demand. The call now is for a well-made, practical machine, and all second-class ones are of short sale.

Those who want a good Lathe with Scroll-Sawing Attachment and all Tools and Improvements to the very latest moment will buy the Goodell Lathe.

Those who want only a Scroll Saw with Drilling Attachment, Rubber Blower and Lever Clamp will prefer the Rogers Saw.

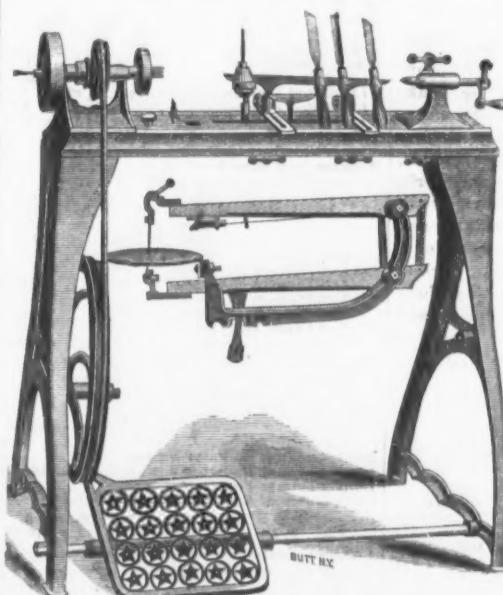
These two machines are taking the place of all others, and are now the most in demand throughout the world.

No dealer can make a mistake by laying in a stock of them. About Christmas time they are wanted in every town, and will make business lively at this otherwise dull season.

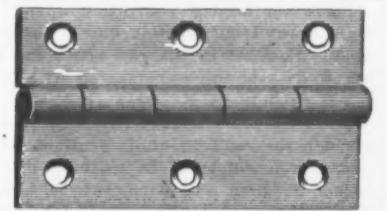
We also keep a full stock of Designs, Wood, and all other Scroll Sawing goods.

Price of Goodell Lathe, complete, \$12.00.

Price of Rogers' Saw, complete, \$3.50.



NO. 51 Lock.
J. C. McCARTY & CO., Agents,
97 Chambers and 81 Reade Sts.,
NEW YORK.
Factory, BROOKLYN, E. D., N. Y.



W. & J. TIEBOUT,
MANUFACTURERS OF
BRASS, GALVANIZED & SHIP CHANDLERY
HARDWARE.
Nos. 16 & 18 Chambers Street,
NEW YORK.



Fully Warranted. Has Patent Adhesive Rolls,
Best Steel Springs, Malleable Iron Crank.
Send for fully illustrated Catalogue and Price
List of thirty different styles and sizes of Wringers.

BAILEY WRINGING MACHINE CO.,
WOONSOCKET, R. I.



11-13 S. Canal St., CHICAGO.

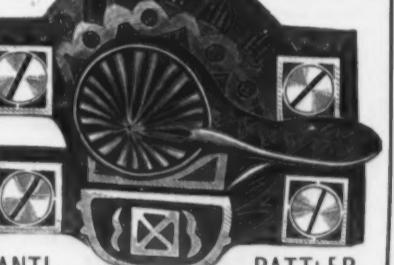
A represents the stationary guiding and locking bar which receives the operating rod C.—B forms with arm E & bracket F the connection with the transom. D is the adjustable guide to hold the guiding & operating rod to the door casing. Handle G in combination with parts A & C forms a novel locking device and will hold the transom in any desired position no matter how the transom may be hinged.

We also manufacture several other devices.

Send for catalogue and price list.

Security Sash Lock.

Pat'd Nov. 9, '86



ANTI-RATTLER.
The Claffen Mfg. Co.,
Cleveland, Ohio, U. S. A. Sole Manufacturers

The "Daisy" Wringer.



Tub Wringers, Bench Wringers, Clothes
Drying Bars, &c.

EMPIRE WRINGER CO., AUBURN, N. Y.

THE BEST AND CHEAPEST
WIRE NAIL
MACHINE,
Tack and Nail Machinery.

W. A. SWEETSER, Brockton, Mass. (39 Montello Street.)

MILLERS FALLS CO., 93 READE STREET, NEW YORK.

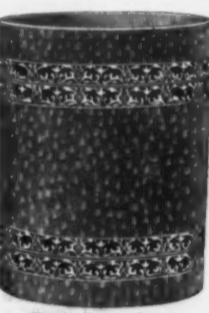
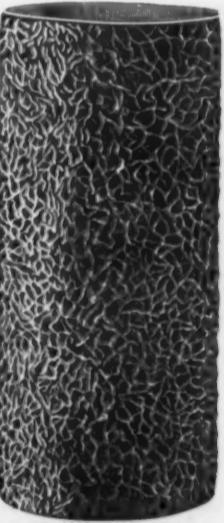


CHRISTMAS NOVELTIES.

Umbrella Stands, Waste Paper Jars

Seamless. No Metal to Tarnish.
Will not break if Tipped
Over.

Decorated or Plain,
For Home Decoration.



"Pa-Crusta" Umbrella Stand.
Waste Paper Jar.
"Full Finish" Umbrella Stand.

Sold by all First-Class Dealers in Crockery, Housefurnishing Goods, Stationery, &c.

Union Indurated Fibre Co.,

110 Chambers St., New York. 39 Wabash Ave., Chicago.

PORLTAND, ME. MECHANICSVILLE, N. Y.
WATERTOWN, MASS. OSWEGO, N. Y.
SKOWHEGAN, ME.

LOCKPORT, N. Y.
WINONA, MINN.

BENEDICT'S PATENT WALL CLOTHES DRYER

IS THE BEST.

It is made entirely of wood, therefore does not rust wet clothes. It has two rows of arms, any one of which may be used without raising the others. It dries quicker, airs better, occupies less space, and is more convenient and cheaper than any other. Send for circulars and prices to

The Benedict Manufacturing Co., 27 Barclay St., N. Y.

WALPOLE

MILLS.

EMERY

SOUTH WALPOLE, MASS.

A New Quilting Machine.

A week or two ago we had occasion to examine, at the works of the Manhattan Quilting and Mfg. Company, 75 and 77 Spring Street, New York, a new form of quilting machine which, in many respects, is of an interesting character. The machine is the invention of Mr. David H. Coles, secretary of the company, and its design, while of too complicated a nature to admit of a detailed description here, will be understood in a general way from the engraving which we annex. As its name implies, the machine contains all the appliances for "tufting," and will turn out "tufted" quilts of varied patterns. Briefly described, the quilting material, which generally consists of two thicknesses of cloth with a layer of cotton batting between them, is fed into the machine from two contin-

monthly pay-roll being about \$10,000. These shops build and repair passenger coaches, freight and flat cars.

The machine shops of the Peoria, Decatur & Evansville railroad are located in the southwestern part of the city, and are nearly as large as those of the I. & St. L., and have greatly added to the growth of the city. It was built and finished in 1881, and is paying out for labor and material large amounts of money each month. In 1872 Wm. Lennox established the Mattoon Foundry. It is one of the thriest business enterprises in the city—employs a number of skilled artisans and is doing an extensive business. Besides supplying the I. & St. L. R. with all of its castings, it fills orders at home and abroad for store fronts, fences, &c. In 1882 Mr. Lennox sold his interest in the plant to Mr. C. G. Mac, who is the sole owner and proprietor. Messrs. J. F.

ings, G. G., and is heated by coming in contact with the exterior surface of the chambers represented by C C, through which the draft is furnished. The chambers C C also serve as outlets for any unconsumed gases. It will be noticed by reference to the engraving that the cold air with which the furnace is supplied is taken from the outside through the flue F. Directly over the fire-pot is a combustion chamber, D, into which the flame ascends, carrying with it unconsumed products, which become heated and mixed with a proper portion of air admitted through a damper in the door or by other suitable means. The shape of the chamber is such that after ascending a short distance the products of combustion are deflected downward and escape to the chamber formed by the outward surface of the circulator and the inward surface of the furnace. Their course to the smoke-pipe is

MANUFACTURING.

Iron and Steel.

The Bellaire Nail Works, of Bellaire, Ohio, were compelled to bank their furnace recently for four days on account of a shortage of coke. During the stoppage some needed repairs were made. The furnace is now in operation.

It is stated that the syndicate of Eastern capitalists recently formed for the purpose of building a large tubular steel car works and railroad supply manufactory have decided to locate the proposed works at Christy Park, in the gas region near McKeesport, Pa. The factory will be built, controlled and operated by New York and other Eastern capitalists exclusively. The estimated capital stock is \$5,000,000. Among the prominent members of the syndicate are George

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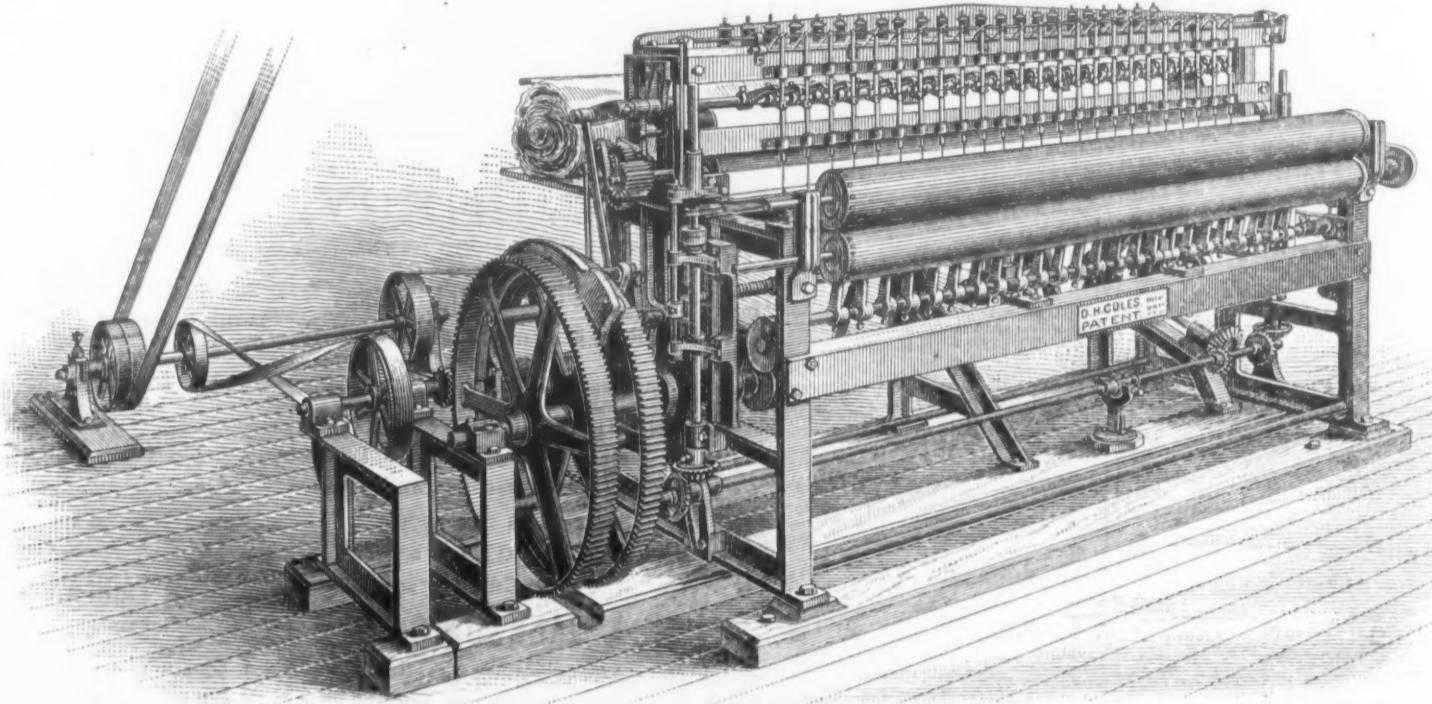
W. D. Manning, roadmaster of the Connellsburg division of the Baltimore and Ohio Railroad, has been granted a patent for a new automatic switch, which has been adopted by the officers of the road, and will be put on the Pittsburgh division at once. The Westinghouse Electrical Company, of Pittsburgh, thus far in November has contracted to furnish plants for over 20,000 lights in various parts of the county. Contracts were made recently to construct a plant for 2600 lights in Albany, N. Y., and a similar plant in Columbus, Ohio.

The Waltham Emery Wheel Company, Waltham, Mass., report their business nearly double that of last year, and increasing rapidly.

The Armington & Sims Engine Company, of Providence, R. I., are now running their works three evenings per week, and, as soon as they are established in new quarters, contemplate running day and night. The Armington & Sims' engine is now built in England, at two places in France and in Germany and Sweden.

Messrs. Blake and Johnson, of Waterbury, Conn., have issued a number of large illustrated circulars relative to their various forms of metal-working machinery. Brief reference is made in every case to weight and sizes. To the trade the circulars will, no doubt, prove of great interest.

The Thomson-Houston Electric Company are building a large edition to their exten-



QUILTING MACHINE AT THE WORKS OF THE MANHATTAN QUILTING AND MANUFACTURING COMPANY, NEW YORK.

uous rolls, the cotton being carded between the cloth on its passage to the machine. The latter is provided with two feeds, which we will call the primary and secondary. The primary feed, formed by rolls, forces the material through the machine between two clamping bars of the secondary feed and under the needles, the latter and secondary feed, in the mean time, remaining stationary. When the material is in its proper place the primary feed ceases operations, the feed bars firmly hold the work, and with it are caused to move horizontally in a closed curve by a step-by-step motion, while the sewing mechanism also operates and the needle descends and stitches through both materials, producing a small circle or polygon of stitches, which pass through and serve to hold together both materials. When this has been accomplished both the second feed and the sewing mechanism stop. Each revolution of the main shaft will cause the needle to descend 12 times—that is, the sewing mechanism will make 12 stitches, which, by the peculiar motion given to the work by the feed-bar, will fall in a circle. To form a complete circle of 12 stitches it will be necessary that the feed bars be carried around in the circle in 11 steps or feed motions, so that when the needle descends the twelfth time it will strike the spot at which it started and complete the circle. In other words, to make a circle or polygon of stitches it is necessary to make one more stitch than there are feed motions. This is accomplished by a suitable train of gearing and cams. The tufting material having been sown on, the next step is to feed the work forward and sideward the desired distance for the next row of tufts. The sideward motion is effected by giving the two rolls, shown in front in the illustration, a lateral travel. This having been done, the feed bars again come into action, the sewing mechanism is started, and the operations already described are renewed. The time required to complete a comfort-able of ordinary dimensions is about 2½ minutes.

Altogether the machine is a decidedly ingenious piece of work, though it should be seen in operation to be thoroughly understood.

Machine Shops at Mattoon, Ill.

The Mattoon, Ill., *Commercial* in a review of the industries of that city says:

The largest machine shop in Mattoon are those operated by the Illinois and St. Louis Railroad Company. They were built in 1870. The machine shops are 120 x 204 feet, with eight repair pits; the power-room, 40 x 50 feet, adjoins the building; store-room, 40 x 60 feet; car shops, 85 x 204 feet, with six repairing tracks, and, with the machine shops, get their power from an 80-horse-power engine. The blacksmith shop is 50 x 150 feet, has 16 fires, and is furnished with one 1500-pound steam hammer. The boiler shop is 50 x 80 feet, and has three repair tracks. The paint shop is 44 x 225 feet, and has two repair tracks. There are 21 stalls in the roundhouse. The turn-table is 77 x 180 feet, and connects with the tracks leading into the different shops. The oil-room is 40 x 40 feet. Has water-tanks with a capacity of 93,000 gallons. The shops and engines are supplied with water from a reservoir $\frac{1}{2}$ mile south of the works and by the waterworks. The buildings are all of brick, with slate roofs, save the paint shop, which is frame. The shops in their arrangement are unsurpassed in the West, and turn out nothing but the best of work. Over 250 men are employed here, the

Chuse & Co. in 1875 established machine shops for the manufacture of locomotives, engines, pumps, &c., but by 1880 their business became so extensive that they enlarged their building and added the foundry. They are making a large line of castings and employ about twenty men. In 1886 B. L. Capen, dealer in engines, mills, separators, &c., erected a brick structure on Western avenue and opened up the fourth machine shop in the city.

The Turner Heater.

We present, by means of the accompanying engraving, a sectional view of a hot-air furnace recently placed on the market

clearly indicated in the engraving by arrows. The company claim that the principle embodied in this furnace is applicable to cooking stoves and ranges, and that it may be employed in connection with portable and stationary ovens, evaporators and the like. The fire-pot is so arranged as to consume a small amount of fuel in proportion to the heat produced, and the makers claim for the device simplicity of construction, economy of fuel and powerful operation.

A very successful test was made at Shoeburyness with Holtzer chrome steel projectiles. It passed through 16 inches of compound armor and 10 feet of solid backing, and showed so little distortion that possibly

B. Kendall and Charles A. Arne, of Boston. The specialty is railroad supplies, freight and passenger cars. From 1000 to 2000 men will probably be employed.

The La Belle Iron Works, of Wheeling, W. Va., report that the rumor that they were compelled to run their nail factory till nine o'clock in the evening in order to keep pace with the demands made on them for nails is untrue. They ran their factory one evening recently till that hour in order to enable them to get out some nails which they were badly in need of to complete orders which had been taken for delivery at low rates of freight, which rates expired on November 1. This has been the extent of their running in the evening.

The Ella Furnace, at West Middlesex, Pa., operated under lease by the Wheeler Furnace Company, of Sharon, Pa., made the extraordinary output in October of 3477 tons of Bessemer iron, or an average of over 112 tons per day. The last week of the month turned out a little over 852 tons, or an average of over 121 tons a day. This is considered remarkable from the fact that the furnace was built with a capacity of but 50 tons per day.

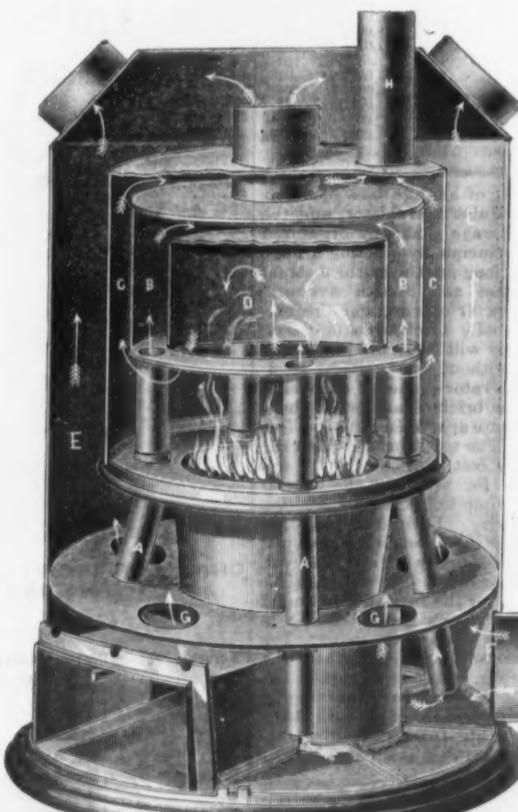
In connection with the output of the Ella Furnace, noticed above, it is interesting to note that Mabel furnace, at Sharpsville, which is operated by Perkins & Co., Limited, made the remarkably large output last month of 3101 tons of foundry iron, an average of 100 tons per day for 31 days. This, it is claimed, has no precedent in the blast furnace in the history of the Shenango Valley. The furnace is only 65 x 14 feet, and uses a 72-inch blowing engine.

On account of the scarcity of coke, Keel Ridge Furnace, of P. L. Kimberly & Co., Limited, at Sharon, Pa., was banked on Monday, the 7th inst., and at present writing is still idle.

On the 7th inst. the Stover Mfg. Company, of Freeport, Ill., put in operation the large new foundry which has just been added to their works. The new building is 250 x 60 feet in area, with a high bridge roof, well lighted and ventilated. It will be used exclusively as a molding and casting room for the manufacture of light castings. It is equipped with a 6-ton Colliard cupola. The company start in with 52 molders, but all told 75 to 80 men will be employed. A two story structure has been erected some 20 feet from the foundry, in which patterns and castings will be stored, and which also contains the engine and milling boxes. The company have sufficient business on hand to keep them employed six months.

From the Ironton (Ohio) *Register*, of the 10th inst., we take the following regarding the industries at that place: "Belfont Furnace stopped a few days last week, to clean hot blasts. Sarah made 44 tons of good foundry iron last Monday, and is averaging over 40 tons per day. The Lawrence mill insurance and arrangements for new boilers are still unsettled. The finishing department is on this week, the forge having been in operation last week, with the limited boiler power at the lower end of the mill. Ironton Furnace is doing splendid work, averaging 48 tons last week, which is far ahead of her former product. Work on the new Hecla Furnace has been suspended until spring."

The Paducah and Mount Vernon Railroad has been surveyed, and contracts are being let for its construction. The road will connect the Ohio and Mississippi, the Louisville and Nashville and the Cairo Short Line, and will develop the coal mines in Gallatin County and the iron mines in Hardin County, Ill., some 10,000 acres. E. A. Quintard, of the Quintard Iron Company, New York, is president.



THE TURNER FURNACE.

by the Turner Rapid Heat Circulator Company, whose office is at No. 7 Colony street, Meriden, Conn. The furnace is the invention of Mr. L. W. Turner, of Yaleville, Conn., and represents the results of a long and careful study of the question of heat. Our readers will be enabled to form a good idea of the general arrangement of the parts and the manner in which the furnace operates by the following description, read in connection with the reference letters of the engraving: In the illustration A A are pipes through which the cold air taken from outside the furnace is conducted to the hot-air chamber designated by the letters B B. By this arrangement the hot-air reservoir is rendered independent of the chambers E E, a point to which the makers direct attention. The cold air passing through the chambers E E is supplied by means of open-

it might have been fired again. A second 12-inch projectile was fired at a Cammell plate, placed at an angle of 45°. It entered into it to such a depth that its head and body were imbedded in it to the depth of 7 to 8 inches, while a Palliser shell made an indentation 2 inches deep and was then shattered.

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In all probability another advance will soon be made in the entire lists of butt-weld and lap-weld wrought-iron pipe. A meeting of the Wrought-Iron Tube Manufacturers' Association will be held in Pitts-

burgh on the 17th inst. to decide on the advance. It is stated that prices have stiffened up recently for these goods, and that the demand is steadily increasing. The smaller sizes of pipe, such as $\frac{1}{2}$ -inch, have been commanding fancy prices for some time. The reason advanced for this is that the manufacturers have for some time been devoting their attention almost exclusively to the manufacture of pipe suitable for gas-line purposes, which action has created a scarcity in the smaller sizes.

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sive factory at Lynn, Mass., and have just closed a contract with the Wainwright Mfg. Company, of Boston, for a 500 horse-power corrugated tube, feed water heater, making the second Wainwright heater to be installed in this plant.

The Newark Machine Tool Works, at East Newark, N. J., write us under date of November 12, 1887, that they are now building for the North Chicago Rolling Mill Company, at their new shops in South Chicago, a gap lathe to swing 9 feet over the shears, 14 feet by 4 feet in the gap by 25 feet between centers. This tool will weigh not far from 100,000 pounds. The head measures 7 feet over all, the main spindle bearing is 16 x 20 and the face plate 9 feet. The bed is 7 1/2 feet wide, with triple shears. The lead screws weighs 2000 pounds. The tailstock spindle is 8 inches by 4 feet long, of steel. This is the largest tool of its kind ever constructed for the State of Illinois, and probably the largest, also, for this State. The Newark Machine Tool Works sold to the same company an enormous double-head, double column drill, to take in work 10 feet high by 12 feet wide. These tools are for the shops now being erected at South Chicago under the superintendence of Mr. E. C. Potter, with Mr. Kriete as mechanical engineer. They have also taken an order from the Cleveland City Forge for a heavy lathe, and are busy with slotters and horizontal boring and drilling machines.

Hardware.

J. Wiss & Sons, Newark, N. J., have completed their new works, erected in order to accommodate their increasing trade. Their factory is now allied to as supplied with everything needed in improved machinery, &c., with all departments enlarged so as to enable them in a short time to meet promptly all demands, the interruption of their business incident to moving, &c., having caused some delay in filling orders.

The Rockford Cutlery Company's works, at Rockford, Ill., were destroyed by fire on the 7th inst. The loss was \$16,000 and the insurance \$8000. The capacity of the works had been doubled a short time before the fire.

A new barb-wire manufacturing company has built a plant at St. Louis, to make a parallel-strand barb wire, beginning with 20 machines. The concern is called the Continental Wire Company, and is composed of D. R. Wolfe, of Wolfe & Good, president; Wm. E. Ware, formerly vice-president and treasurer of the N. O. Nelson Mfg. Company, treasurer; Charles S. Hale, recently secretary of the Southern Wire Company, secretary; Chas. F. Hintze, recently secretary of the Southern Wire Mill Company, general superintendent.

The foundation has been laid for the pin and tack factory building which is being erected by the Elyton Land Company, at Birmingham, Ala. The building will be of brick, 50 x 100 feet in size, and will have two stories, the first being 16 and the second story 15 feet in height.

The Terry Mfg. Company, Horseheads, N. Y., have recently purchased the foundry and machine shop formerly owned by G. F. Tomlinson. These works are being refitted and will be used in addition to the company's present plant for the manufacture of their several styles of barn door hangers and various specialties of hardware.

A decision was rendered by the United States Supreme Court, on the 14th inst., in the case of Charles W. and Frederick Siemens appellants, against Wm. Sellers and others. Appeal from the Circuit Court of the United States for the Eastern District of Pennsylvania. This is a suit for alleged infringement of a patent granted to the Siemens Brothers, of England, upon their well-known regenerating furnace. The defendants do not deny that the Siemens Brothers were the authors of the ingenious invention covered by the patent, nor do they deny that they use it. Their contention is that the Siemens Brothers took out an English patent for the same invention on the 19th of July, 1861, and that by force of the acts of 1839 and 1861 the American patent expired at the end of 17 years from the sealing of the English patent—namely, on July 19, 1878. They deny that they used the said invention before the last mentioned date. The questions to be decided, therefore, are whether the English patent was for the same invention as the American patent, and, if so, whether the latter was limited to expire at the end of 17 years from the sealing of the former. The court holds that both of these questions must be answered in the affirmative, and it, therefore, sustains the decree of the Circuit Court in favor of the American users of the Siemens invention. Opinion by Justice Bradley.

A number of prominent city officials of Toronto, Canada, were in Pittsburgh last week for the purpose of noting any improvements made in that city recently which would be of interest to them. The gentlemen propose to visit a number of American cities for the purpose of preparing themselves to give out an immense contract to improve the city of Toronto, which involves several millions of dollars. They are instructed to note the best methods of laying gas-pipes, making pavements and constructing roadways and road beds. They intend to pave the principal streets of Toronto with granite blocks; \$500,000 will be spent in beautifying the parks, and all the ravines in the vicinity of the city will be drained and terraced.

The first truss of the Poughkeepsie bridge was recently finished and swung clear. It is 525 feet long between centers of towers, 82 feet deep and 25 feet wide, being the largest and heaviest steel truss in the world. It rests on steel towers 100 feet high, which stand on masonry piles, whose foundations are 125 feet below high water, and which rise 30 feet above high water, and total height from foundation 337 feet. It carries a floor system on top for double track railway, and is capable of supporting a rolling load of 3000 pounds to the running foot on each track.

Imports.

The Imports of Iron and Steel, Hardware, &c., at this port from November 5 to November 14, inclusive, were as follows:

Iron and Steel.

	Tons
Pig Iron: G. W. Stetson & Co.	280
R. Crooks & Co.	289
N. S. Bartlett.	200
Crocker Bros.	100
Jas. Williamson & Co.	100
T. J. Wilson.	3
Iron Ore: Naylor & Co.	3,032
Spiegelstein: Naylor & Co.	500
J. A. Jansen.	413
Crocker Bros.	243
Gesellheimer & Co.	110
Sam. W. L. Wagner.	21
J. Abbott & Co.	16
M. Cohn.	16
C. Hugill.	16
Steel Rods: J. Abbott & Co.	900
Naylor & Co.	49
A. Heyn.	49
R. H. Wolff & Co.	49
Cary & Moen.	49
Iron: The New Iron Company.	10
Steel Blooms: Naylor & Co.	156
Steel Billets: A. Milne & Co.	108
Steel Plates: A. Milne & Co.	57
A. Milne & Co.	49
Union Bridge Company.	16
Steel Forgings: Thos. Prosser & Son.	180
Steel Tubes: J. S. Leng.	5
Steel Bars: Union Bridge Company.	50
Naylor & Co.	10
Steel Sheets: Pierian & Co.	15
Scrap Steel: Theo. Ringer.	15
Corset Steel: R. H. Wolff & Co.	100
Wire Rods: R. H. Wolff & Co.	101
Wrought Wire Rods: Page, Newell & Co.	101
Taggers' Iron: Newell Bros.	125
Iron Pipes: W. H. Wallace & Co.	9
Boiler Tubes: Henderson Bros.	9
Tin Plates.	Boxes.
Pratt Mfg. Co.	8,900
Bruce & Cook.	3,631
Phelps, Dodge & Co.	8,626
T. B. Coddington & Co.	3,592
Dickerson, Van Duzen & Co.	6,252
A. A. Thommen & Co.	3,574
R. Crooks & Co.	1,130
Jas. Byrne & Son.	468
Wolff & Roseng.	158
C. S. Mersic & Co.	474
N. L. Cort & Co.	1
Metals.	Pounds.
Tin: Phelps, Dodge & Co.	294,476
Naylor & Co.	108,145
Chas. Schramme.	1,155
Nickel: McCay & Sanders.	10,000
Type Metal: Jas. Fraser.	117,125
Antimony: Phelps, Dodge & Co.	70
American Metal Co.	4
Irons and Metals Warehoused from November 5 to November 14 inclusive.	Tons.
Old Iron Rails: Jas. E. Pope, Jr.	1,207
Neumark & Gross.	600
G. W. Stetson & Co.	425
Scrap Iron: Jas. E. Ward & Co.	100
Galvanized Wire: E. S. Greeley & Co.	25
Hardware, Machinery, &c.	
Alexandre, F. & Co., Machy, pkgs. 42	
American Metal Co., Cases, 5	
Armington & Sims Engine Co., case, 1	
Baur, C. M. von, Hdw., cs, 3	
Boker, Hermann Co., Hdw., cs, 80	
Brown & Ordinance, Guns, cs, 5	
Curley & Bros., Cases, 1	
Car & Hobson, Castings, box, 1	
Clark, G. A. & Bros., Machy, cs, 45	
D-graue & Aymar, Chains, chks, 5; Cables, 5	
Field, Alfred & Co., Cases, 5	
Fowler, J. G., Machy, case, 1	
Graef Cutlery Co., Cases, 5	
Godfrey, Chas. J., Cases, 7	
Gurney, F. B., Cases, 2	
Hawthorne, F. & Co., Cases, 1	
Hill, A. & Son, Machy & Co., Nails, cs, 37	
Lima, D. A. & Co., Iron pump, 1	
Master & Co., Machy, pkgs, 9	
McCoy & Sanders, Hdw., cs, 3	
Outerbridge, A. E. & Co., Machy, case, 1	
Perry & Ryer, Gun barrels, cs, 10	
Pilditch, F. S., Mds., cs, 130	
Scoville Mfg. Co., Mds., cs, 62	
Schutte, W. & Co., Hdw., cs, 3	
Sheldon, R. S. & Co., Hdw., cs, 16	
Shoemaker, C. E., Cases, 3; cs, 5	
Taylor, Thos., Cases, 5	
Tiedemann, T., Brass roller, 1	
Uhlmann, S. & F., Machy, pkgs, 35	
Wirths Ed., Skates, cks, 13; do, cs, 2	
Wuebisch & Hulger, Hdw. and Cutlery, cs, 2; do, cs, 1; Mds., cs, 18	
Witte, J. G. & Bros., Cutlery, cs, 2	
Order—Machy., pgs, 5; Machy., cs, 15; Anchors 20; Chains, 40	
According to the Metal Exchange reports, the imports into New York for October were as follows, in gross ton:	
Eight	Tons
Iron Ore.....	28,163
Scrap Iron.....	96,084
Pig Iron.....	74,959
Old Rails.....	102,808
Scrap Iron.....	15,960
Steel Scrap.....	15,251
Steel Blooms and Billets.....	56,713
Wire and Nail Rods.....	73,157
Iron Bars.....	9,277
Steel Bars.....	7,257
Iron Beams.....	1,520
Sheet Iron.....	1,262
Steel Sh'ts and Plates.....	6,887
Tin.....	7,457
Tin Plates.....	1,298,647
Taggers' Iron.....	7,968
Paints, Oils, &c.	Boxes.
Black, Lamp—Coach Painters'.....	W D 22 @ 246
Black, Ordinary.....	66
Black, Ivory Drop, fair.....	12 @ 156
Black Paint in oil, kegs, 84; assorted cans, 116	12 @ 156
Blue, Prussian, fair to best.....	40 @ 554
Chinese dry.....	18 @ 200
Ultramarine.....	18 @ 200
Van Dyke.....	10 @ 120
Dryers, Patent American, ass'd cans, 96; kegs, 79	10 @ 120
Green, Chrome.....	15 @ 224
Green, Chrome in oil.....	14 @ 18 @ 256
Green, Paris, in oil.....	good, 20@; best, 25@
Iron Paint, Bright Red.....	W D 214@
Iron Paint, Bright Red.....	W D 214@
Iron Paint, Purple.....	W D 36@
Mineral Paints.....	2 @ 46
Orange Mineral.....	104
Red Lead, American.....	104
Red Enamel (Eng.) dry.....	\$1.05 @ \$1.70
Red Venetian in oil.....	ass'd cans, 116; kegs, 84
Red Indian Dry.....	9 @ 120
Rose Paint,.....	10 @ 120
Sienna, American Raw, powdered.....	46
Sienna, Burnt, powdered.....	46
Sienna, Burnt, in oil.....	10 @ 16 @ 20@
Sienna, Raw,.....	11 @ 15 @ 25@
Paints.	
Black.	
Black, Lamp—Coach Painters'.....	W D 22 @ 246
Black, Ordinary.....	66
Black, Ivory Drop, fair.....	12 @ 156
Black Paint in oil, kegs, 84; assorted cans, 116	12 @ 156
Blue, Prussian, fair to best.....	40 @ 554
Chinese dry.....	18 @ 200
Ultramarine.....	18 @ 200
Van Dyke.....	10 @ 120
Dryers, Patent American, ass'd cans, 96; kegs, 79	10 @ 120
Green, Chrome.....	15 @ 224
Green, Chrome in oil.....	14 @ 18 @ 256
Green, Paris, in oil.....	good, 20@; best, 25@
Iron Paint, Bright Red.....	W D 214@
Iron Paint, Bright Red.....	W D 214@
Iron Paint, Purple.....	W D 36@
Mineral Paints.....	2 @ 46
Orange Mineral.....	104
Red Lead, American.....	104
Red Enamel (Eng.) dry.....	\$1.05 @ \$1.70
Red Venetian in oil.....	ass'd cans, 116; kegs, 84
Red Indian Dry.....	9 @ 120
Rose Paint,.....	10 @ 120
Sienna, American Raw, powdered.....	46
Sienna, Burnt, powdered.....	46
Sienna, Burnt, in oil.....	10 @ 16 @ 20@
Sienna, Raw,.....	11 @ 15 @ 25@
Oils.	
Umber, Burnt, powdered.....	4 @ 8@
Umber, Burnt, in oil.....	9 @ 12 @ 15@
Umber, Raw, powdered.....	4 @ 7@
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Pumice Stone	



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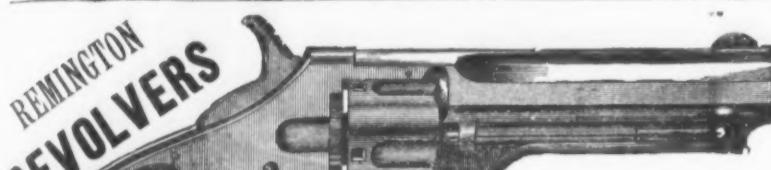
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The Manufacture of Tin Plates.

BY W. STERCKEN.

The Prussian Society for the Promotion of Industry makes arrangements every year to have special reports, for which prizes are paid, on some industry or on some line of special investigation. Among these was a report on the manufacture of tin plate, W. Stercken, an engineer connected with the German Patent Office, succeeding in obtaining the prize, his report being published in full in the transactions of the society. It is a very elaborate document, with many illustrations, some of which possess an interest only as showing the development of inventive genius as applied to the manufacture of tin plates, but the majority giving drawings of plant and apparatus in actual use. We feel convinced that it is by far the most complete and accurate description of its kind yet put before the public concerning an industry, the technical details of which have been rarely allowed to appear in print. Since the United States are consumers of the larger part of the product of the Welsh Tin Plate Works, American consumers will follow it with some interest. While we cannot reproduce the entire report in full, an abstract, including its most important features, will be presented.

Mr. Stercken naturally divides the process of manufacture into three principal operations. First, the manufacture of the black plates; second, the preparations for tinning, and third, the tinning of the plates.

THE MANUFACTURE OF BLACK PLATES.

We cannot dwell upon the preliminary operations of puddling, or the manufacture of tin-plate bars from steel. All that it is necessary to state is that in using steel it is estimated that there is a reduction in the consumption of tin in coating amounting to 10 per cent. The ingots, as cast from the Siemens furnaces, are produced chiefly by the pig and ore process. Bottom casting being employed, the ingots are cast in blocks of four, and weigh about 200 pounds. Another point in favor of steel is that the waste by oxidation is reduced by about 30 per cent., and that there is a smaller number of waster plates. On the other hand, a somewhat larger consumption of acid has followed the use of steel for plates. The ingots are usually 800 mm. long by 100 x 150. They are hammered, and then rolled into bars, which are usually 200 mm. wide by 20 mm. thick, occasionally beveled in order to allow them to enter the rolls more readily. The length depends upon the size of the plate to be rolled. Generally it is about 2 cm. longer than the width of the finished plate, in order to allow for trimming. The bars are heated in the simple reverberatory furnace with ordinary grate and a slight draft. The roll trains are both 2-high and 3-high. In the former the lower roll is driven, the upper being carried along. For 3-high trains the Lauth-Davis system is used at a number of places. It consists of the 3-high roughing *b*, Fig. 1, with its middle roll having a smaller diameter than the two others. For that reason it allows a very rapid reduction of the bars. The finishing trains have two rolls, the upper being carried along. The engine is coupled direct to the lower finishing roll. This drives the lower roughing roll. In England 25 tons of black plates are produced in three shifts per day in an ordinary train.

Mr. Stercken describes at length the different shears used for trimming the plates, a subject which we need not go into. All that it is necessary to say is that the bars are heated to a strong red heat for wrought iron, and to dark cherry for steel. The latter must be rolled as cold as possible in order to obtain a smooth surface. Before the tin-plate bars go to the rolls, the reheating scale is removed, either by dipping in water for a short time or striking it against the roll housing, or by hammering them on plates. This work, which was necessary with iron, is not needed in the case of steel when the heating furnaces are well designed. The bars are put through the rolls four to six times, either singly or two in rapid succession, in the direction in which the grain is parallel to the axis of the rolls. After every pass the rolls are screwed down. In the case of iron, the plates so produced were pickled for 20 or 30 minutes in dilute hydrochloric acid kept in a lead trough placed in a heated water-bath. This was followed by washing the plates in flowing water, and scouring them with a strong brush. In the case of steel this treatment is not carried out. After rolling, the plates go directly to the reheating furnaces, and after being brought to a dark red they are rolled in the finishing passes by gradually approaching the rolls. Then the doubling begins. This is done very skillfully by the doubler, who bends over the plate, the bend being knocked down with wood or iron hammers, or under a press. After being again heated the double plates are put into rolls with the bend foremost. After rolling they are torn asunder at the bend, or the latter is cut off. The two plates are placed with their outer surfaces turned inward, and are again doubled. Sometimes they are put for a moment in dilute acid, followed by washing in water, and then they are again piled in a heap in the reheating furnaces. This, according to the grade of the plate, is succeeded by the final rolling, and formerly it was the custom, in order to get rid of the roll scale, to plunge them into water. Under certain circumstances the doubling must be done three times more, so that, starting from the 1st to the 5th doubling, 2, 4, 8, 16 and 32 plates are simultaneously rolled out. Sometimes a few sheets are inserted between the packages, so that with a certain fixed position of the rolls any needed gauge or plate is produced. At some works the plates are torn apart after every rolling which makes it easier to separate the sheets finally. The top and bottom sheets naturally have more scale than those lying between them, and, therefore, it is the custom either to use them over and over again or to separate them from the others and pickle them for a longer time. The rolls require frequent turning because they are rapidly worn by rolling steel.

For two furnaces and one plate train, one roller, one doubler and one catcher are needed. The doubler beats the tin bars and turns them over to the roller, from whom they go to the catcher. The doubler doubles the plates and puts them back into the furnace. The black plates thus rolled are put under the shears and trimmed to the exact width of the tin plate. The length is generally made from 10 to 3 mm. short, because some elongation of the plates takes place during the cold rolling. After being sheared, the plates are torn asunder, an operation which is difficult occasionally in the case of iron sheets on account of the high temperature employed in rolling. Formerly the plates after every rolling were dipped in clay water, mixed with some coal dust. Good plates are perfectly smooth, without edge cracks, and have a mottled appearance of dull black and of dull silver gray.

being put in each of the intertices shown. Even now so-called hand pickling is done, especially for the final pickling. They have a pickling bath (*a*, Fig. 4) and beside it several, generally three, washing vats with flowing water. Between the pickling and the washing vat there is a slightly inclined lead plate, *c*, which causes the acid running off from the basket full of plates to drip back into the pickle. The loss by waste in pickling amounts to 3 pounds per box of IC for iron, while the consumption of acid is 10 pounds. The method of handling the overhead traveler is shown in our illustration, counterweight, *a*, being used to make the handling easier. In these pickling baths the vat is kept full with baskets, and as the one nearest the end is lifted out, and is put into the washing vat, the whole line is moved one forward, making room for a new lot at the other end.

It is evident that the pickling process must proceed more rapidly, the more either the plates or the acid is agitated, because in this way fresh particles of acid are brought into contact with the fresh surface of the plate, and the little bubbles of hydrogen attached to the plates are removed. It was therefore a well-known means to increase the effect of pickling, aside from concentration and heat, to move the plates frequently, a method, however, which is unsatisfactory. Therefore efforts were made to keep the pickling acid constantly moving by stirring apparatus.

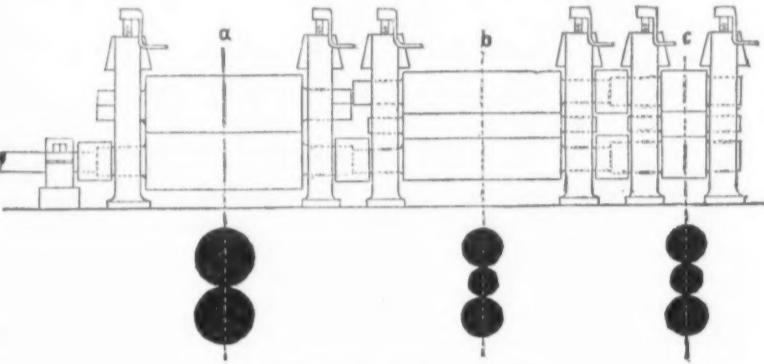


Fig. 1.—Lauth-Davis Plate Train.

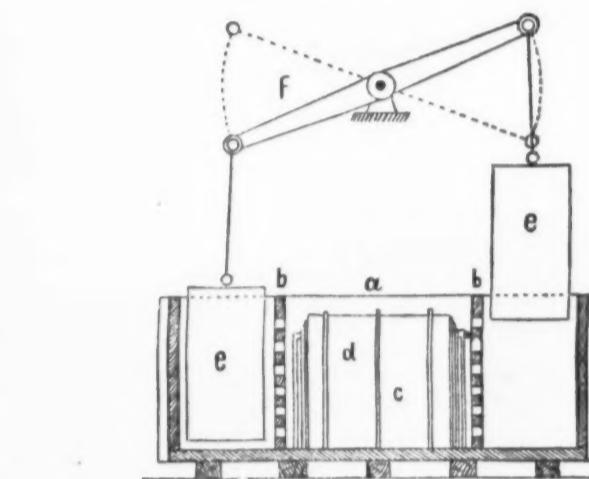


Fig. 5.—Pickling Machine.

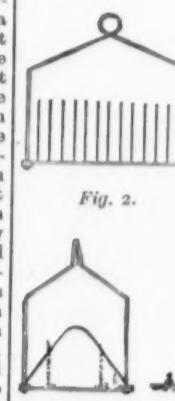


Fig. 2.

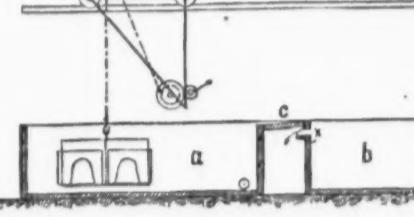


Fig. 3.

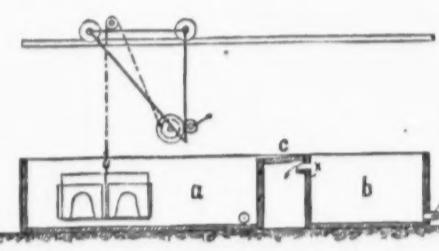


Fig. 4.

Hand Pickling Vats.

MANUFACTURE OF TIN PLATES.

to remove the roll scale produced in the foregoing operations.

The use formerly of inaccurate hand shears, with which two men could in 12 hours trim 25 boxes of IC plates, made it necessary to go over the cold rolling process several times. In reality, this was necessary once only, so far as the smoothing of the surface was concerned, the other times being needed to straighten the plate after being bent at the edges. Then the process was as follows: 1. Rough trimming of the package; 2, pickling; 3, straightening under rolls; 4, annealing; 5, cold rolling; 6, accurate trimming; 7, straightening under rolls; 8, pickling; 9, scouring.

A. Pickling.—In order to get rid of the heating scale and expose the clean metal surface, the plates are pickled in acids, followed, of course, by careful washing with water. Formerly a number of different substances were used for pickling, but now hydrochloric or sulphuric acids are almost exclusively used. Formerly the pickling bath was heated by direct firing, but now live steam is put into it through coils. The pickling baths are made of pitch pine or stone. Lead has been used, but it has been found that the tin bath after a while is rendered impure by lead, and it has been impossible to explain this, except by assuming that lead is dissolved in the pickling, is precipitated on the sheets, and in this way gets into the tin bath. The pickle must touch all the entire surface of the sheets. If this does not occur, deep black spots appear on the plates, which will not take the tin. Modern practice is to put the plates into baskets of brass or bronze, which can easily be lifted in and out of the pickle. Figs. 2 and 3 illustrate such a basket, one plate

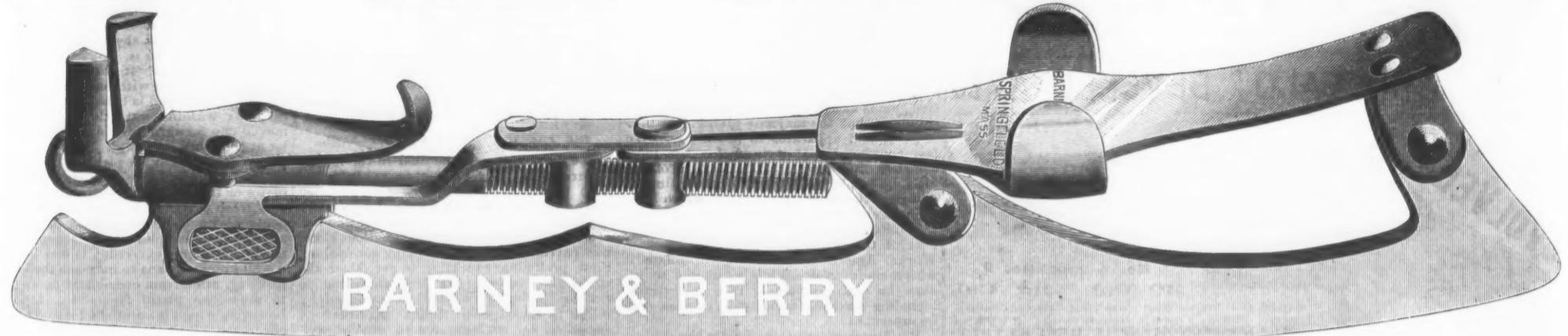
The same aim was in view in building the pickling machine, Fig. 5, which is in actual use. The pickling bath *a* is divided by the perforated partitions *b* into three divisions, in which rack *c* is arranged to take the plates *d*, placed upright parallel to one another. In the two other divisions the plungers *e* move up and down. In some cases the arrangement has been made to give the entire pickling vat an oscillating movement, keeping the plates in a fixed position. It is only recently that the idea has been suggested to move the plates by mechanical means, and these machine picklers, as they are called, are made to combine with the pickling the subsequent washing with water. They are now in use in nearly all English works, both for preliminary and for final pickling.

(To be continued.)

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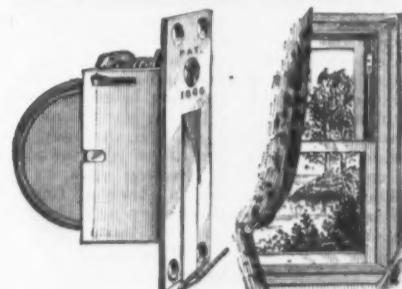


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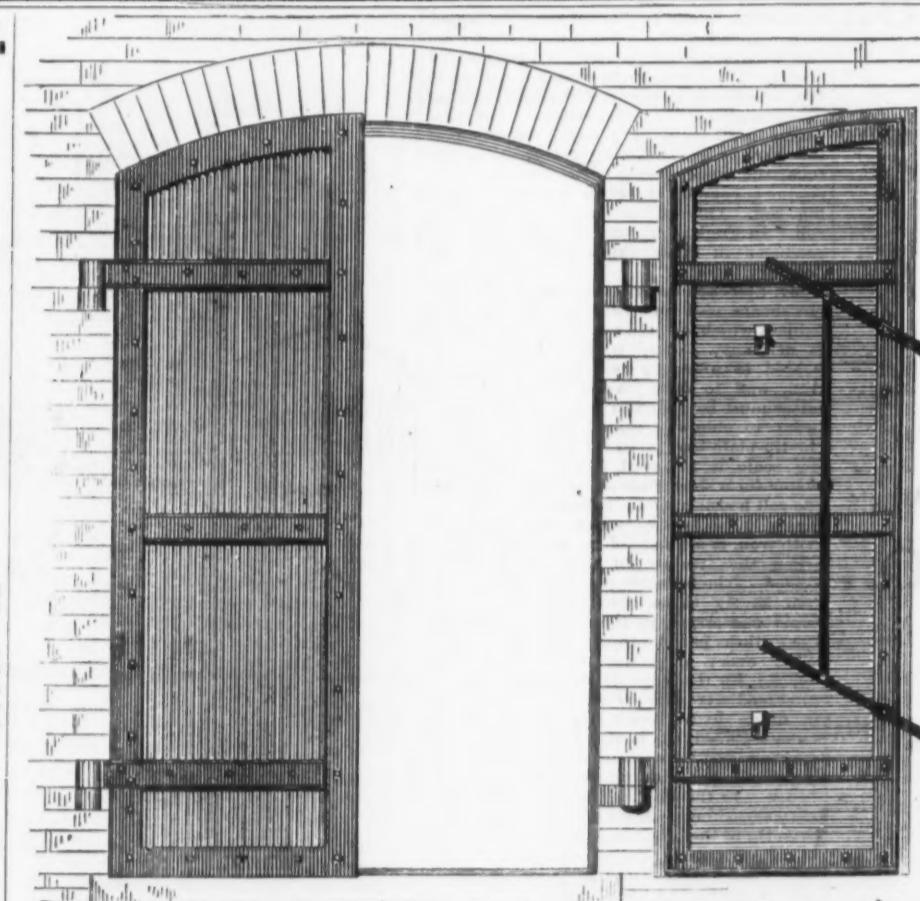
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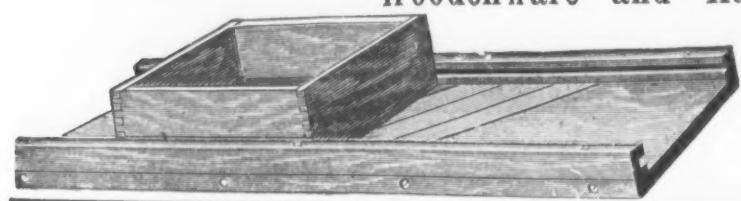
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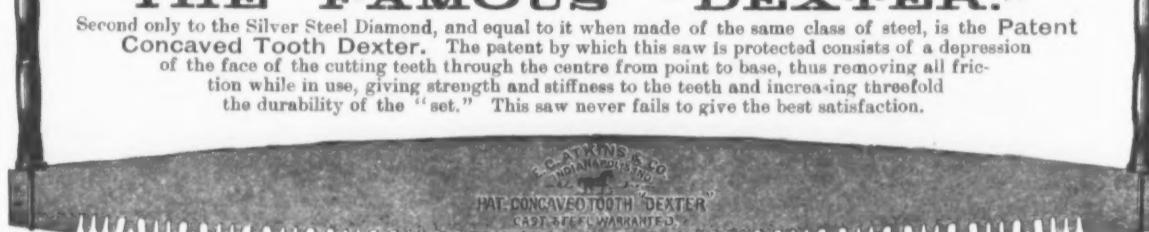
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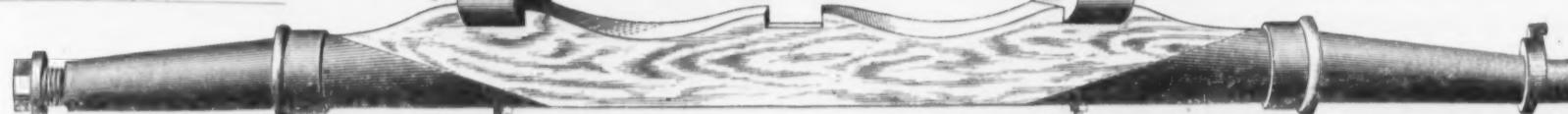


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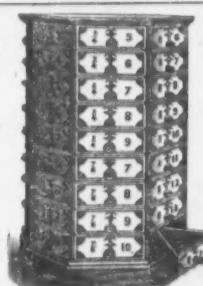
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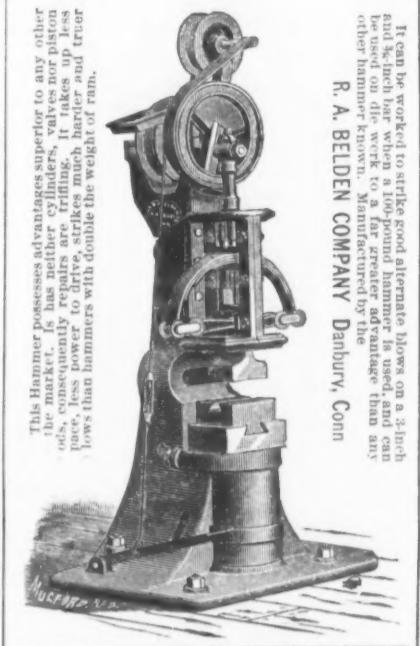
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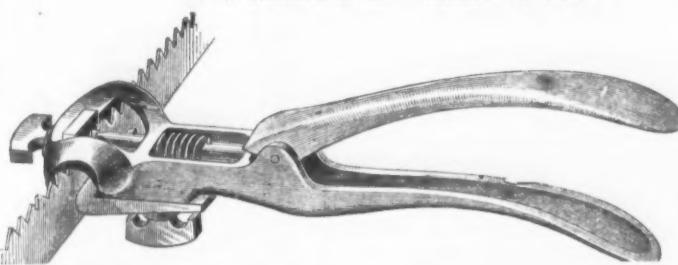
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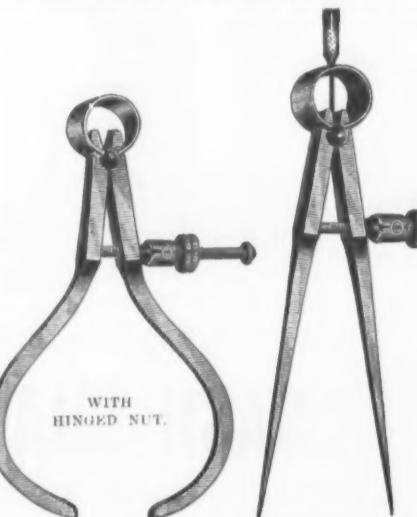


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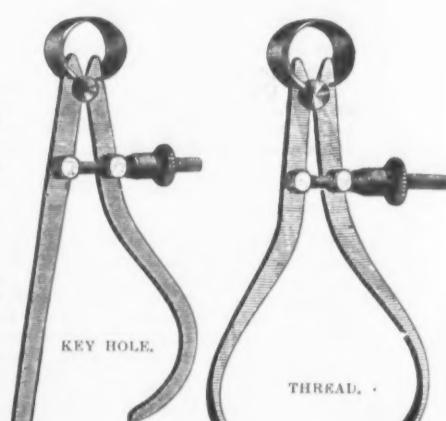


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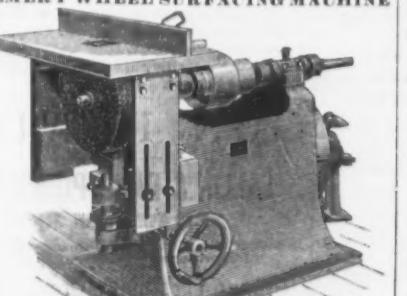
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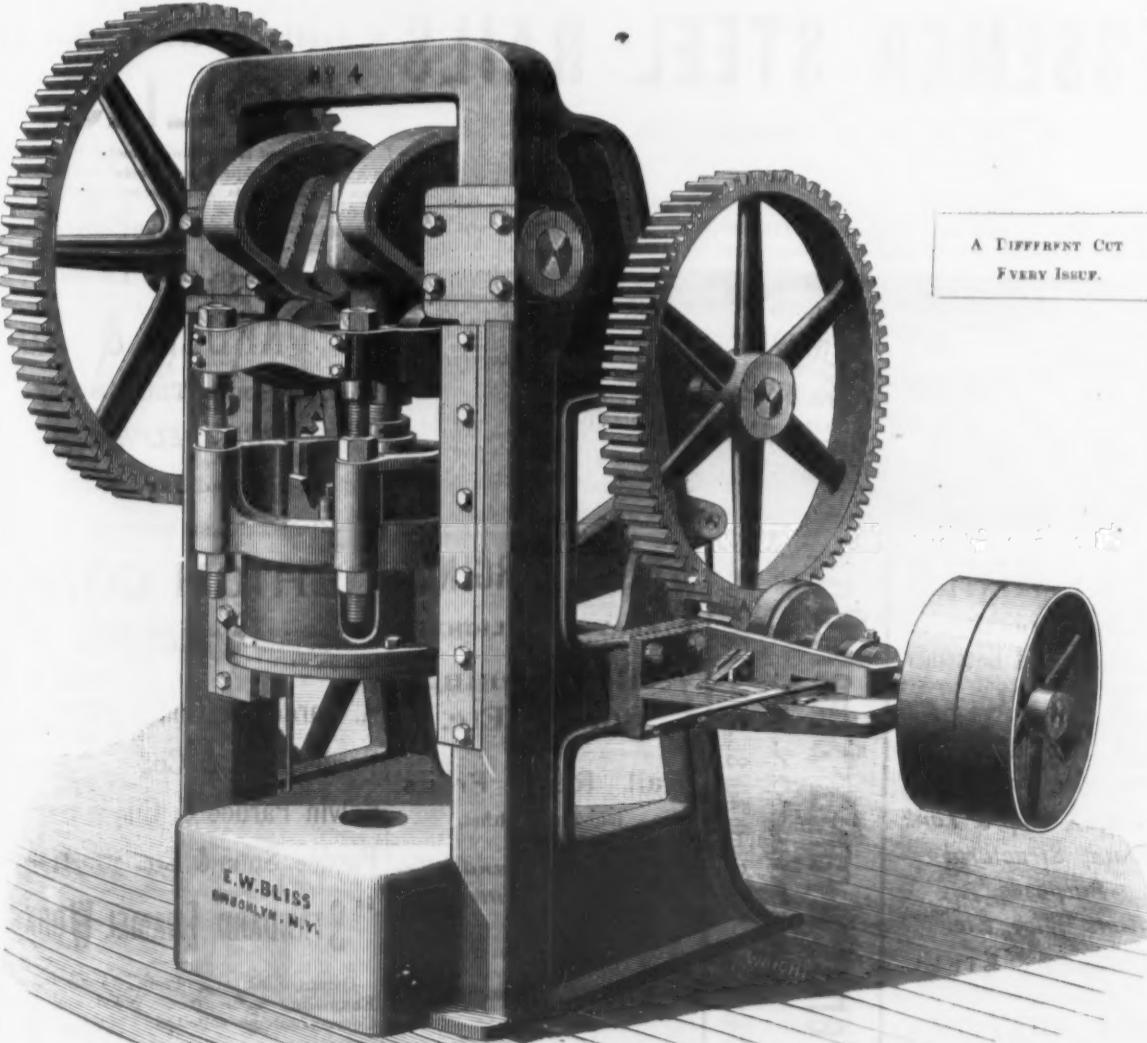
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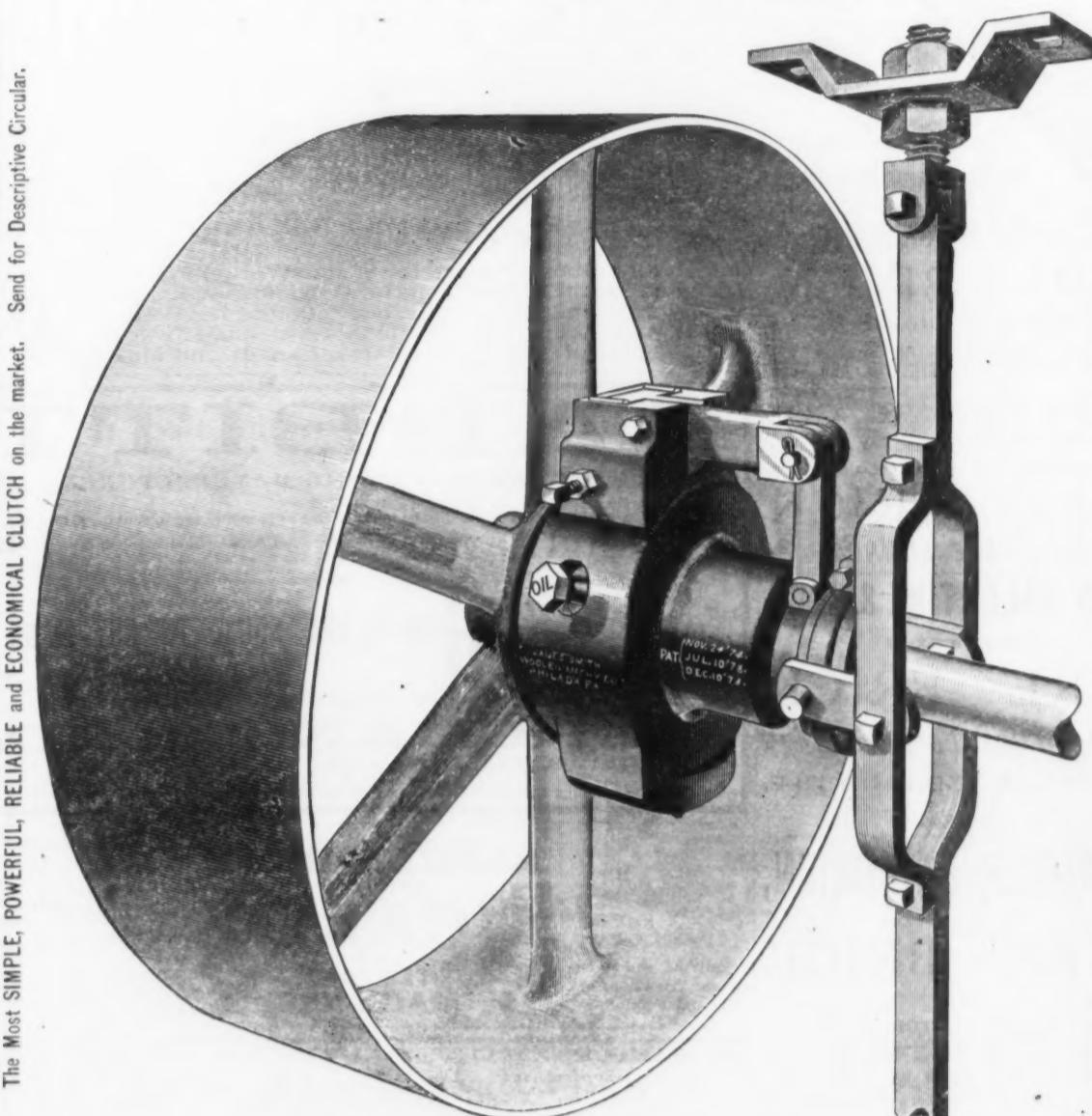
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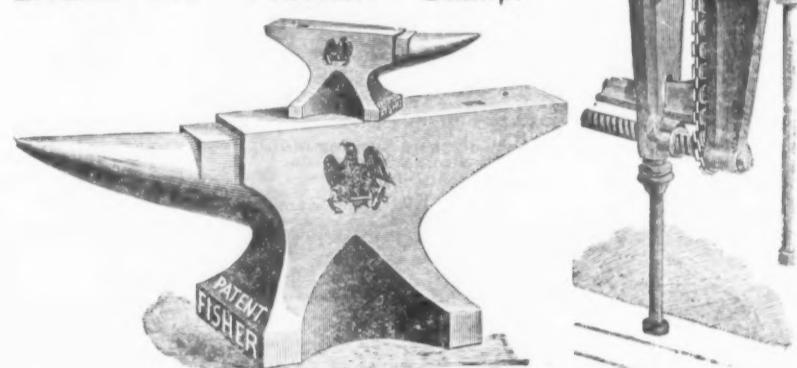
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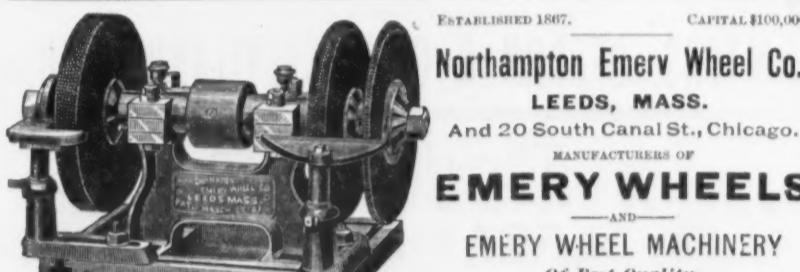
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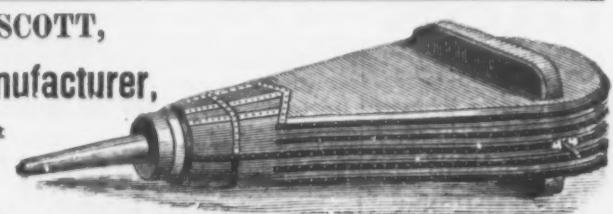
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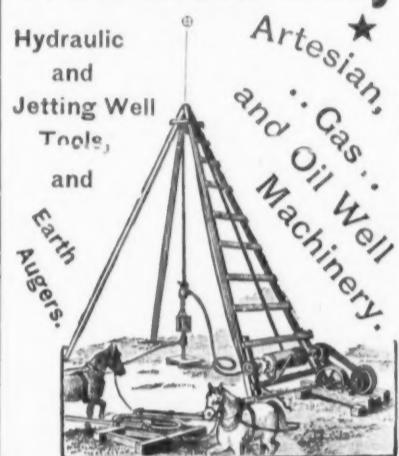
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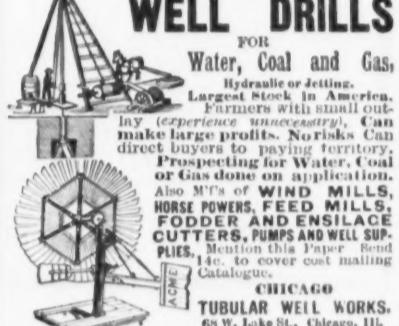
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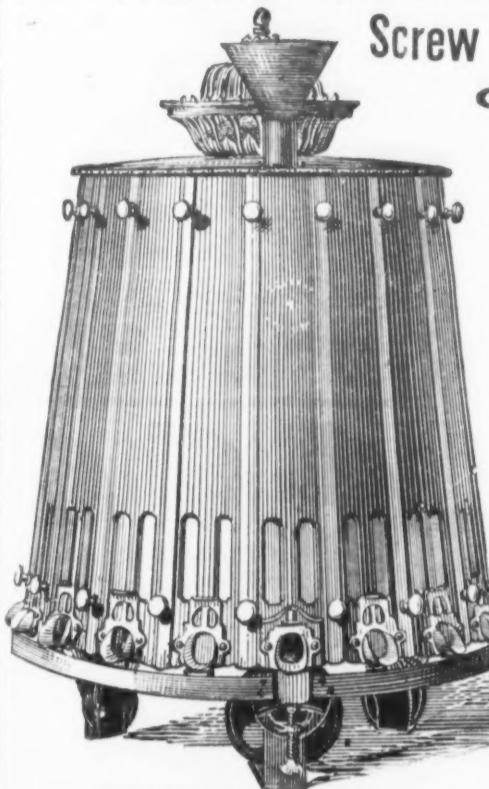
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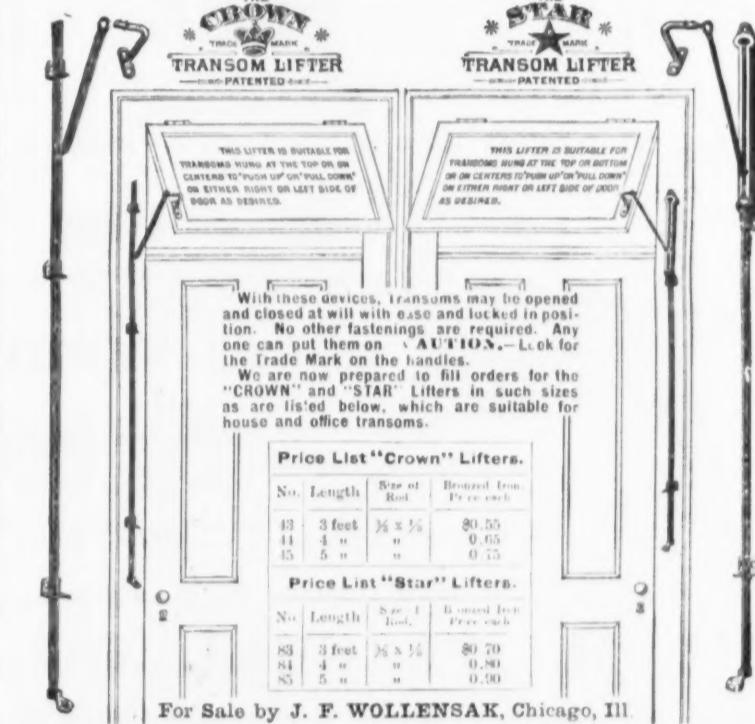
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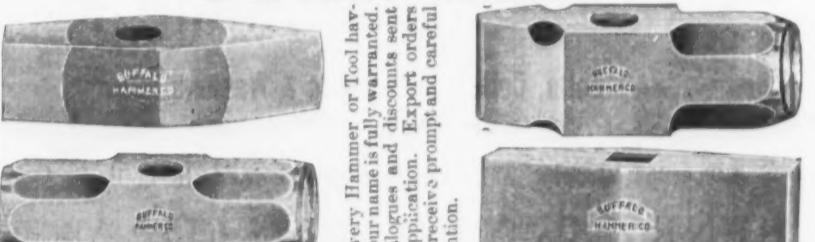
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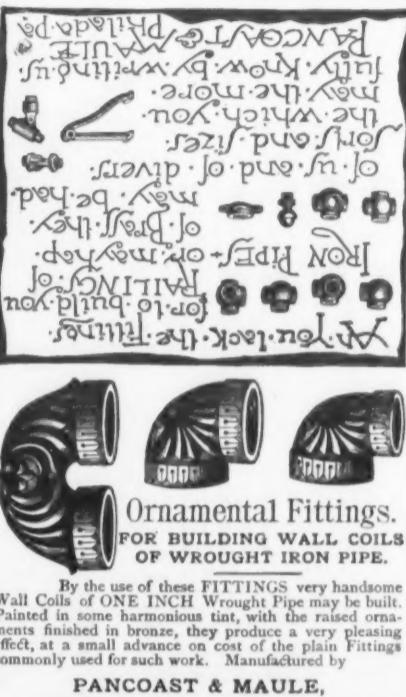
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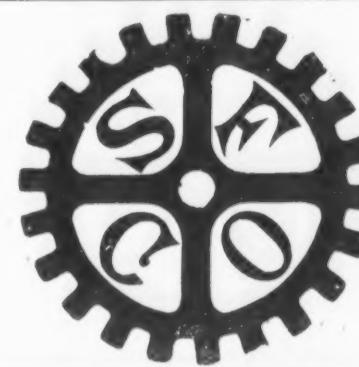
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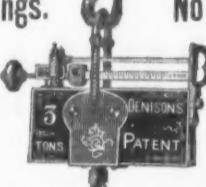
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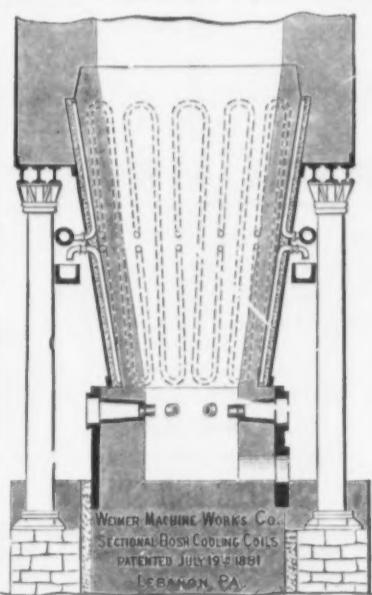
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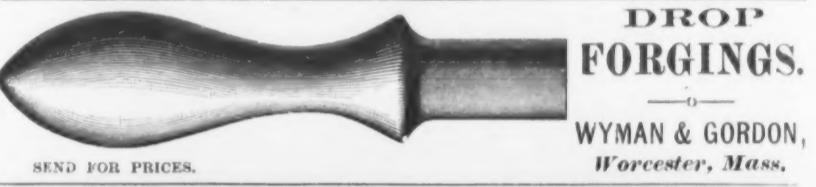
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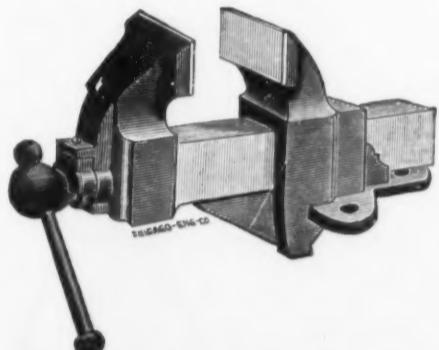
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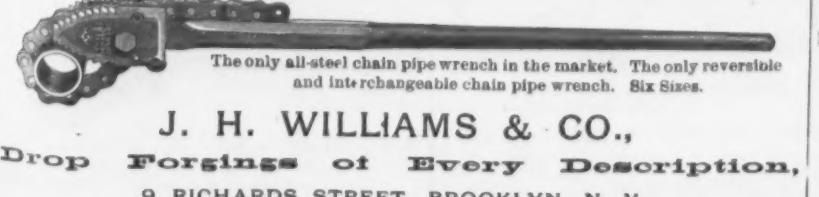
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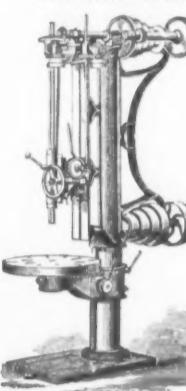
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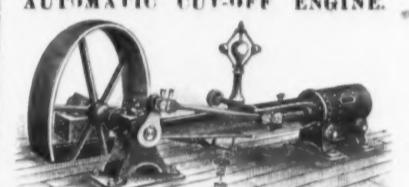
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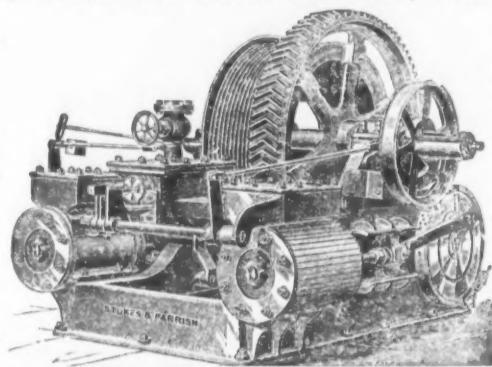
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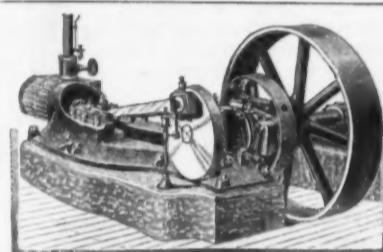
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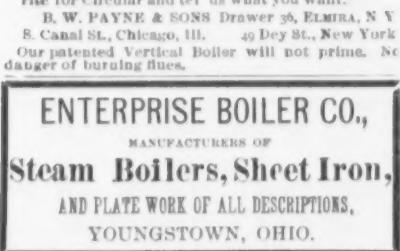
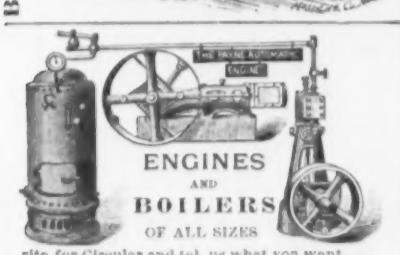
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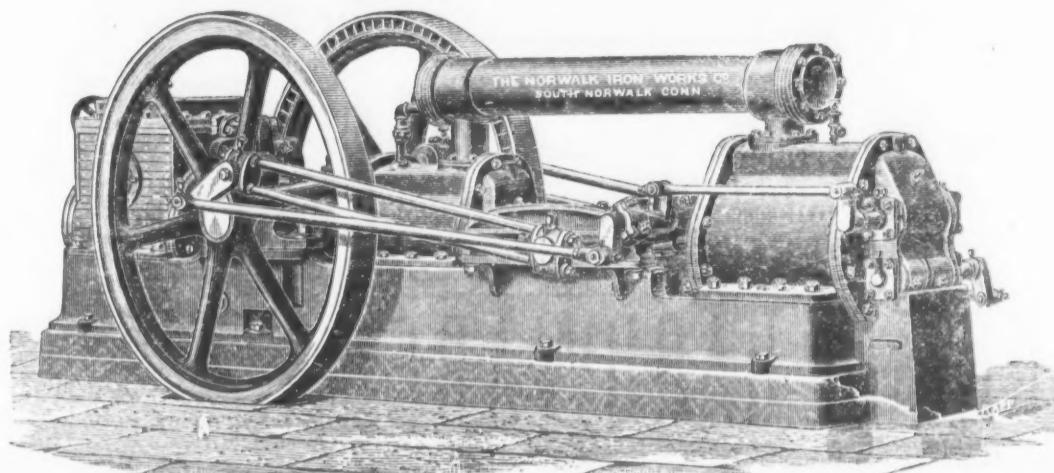
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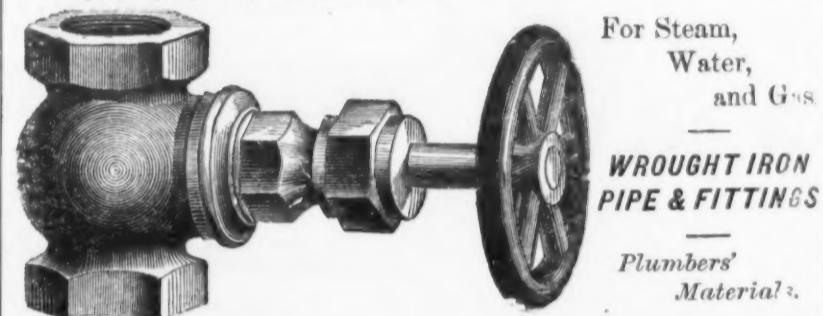
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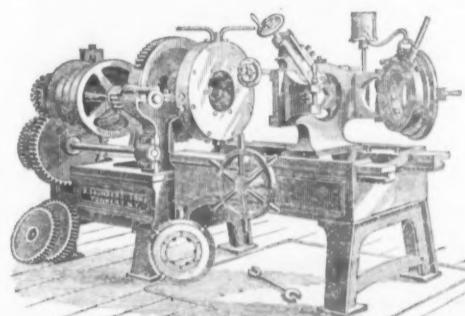
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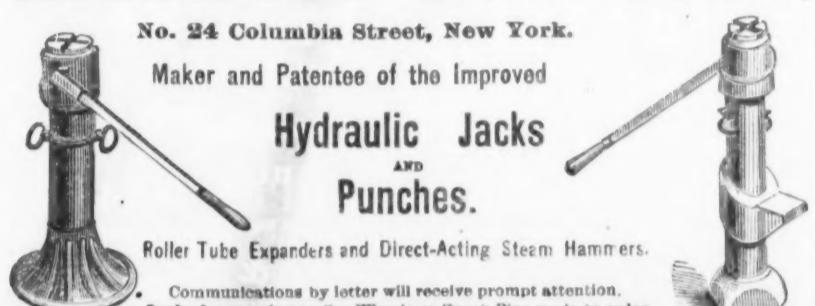
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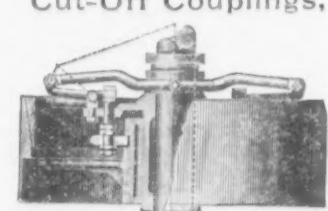
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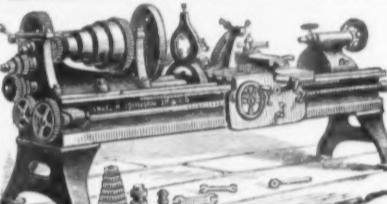
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